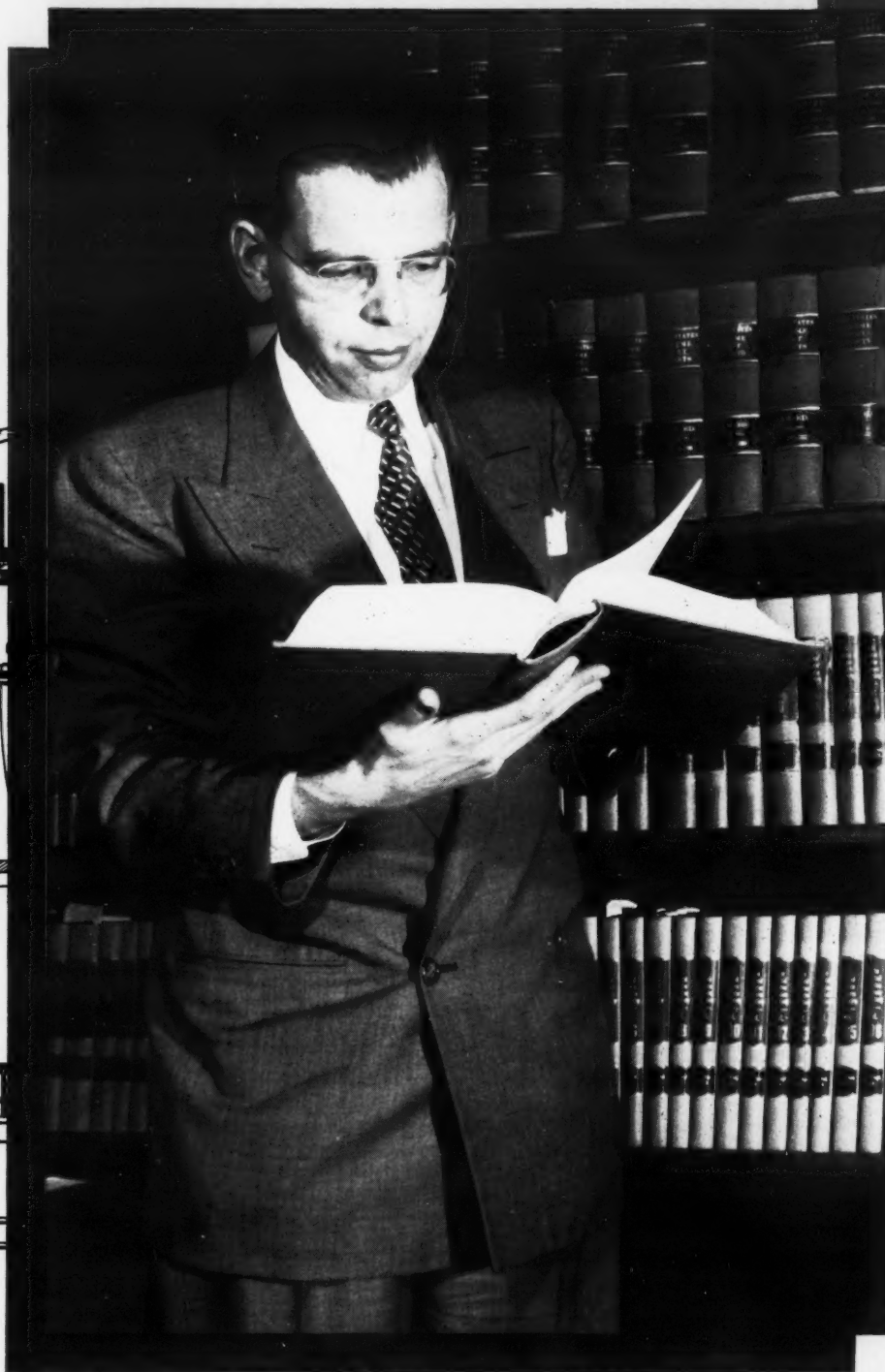
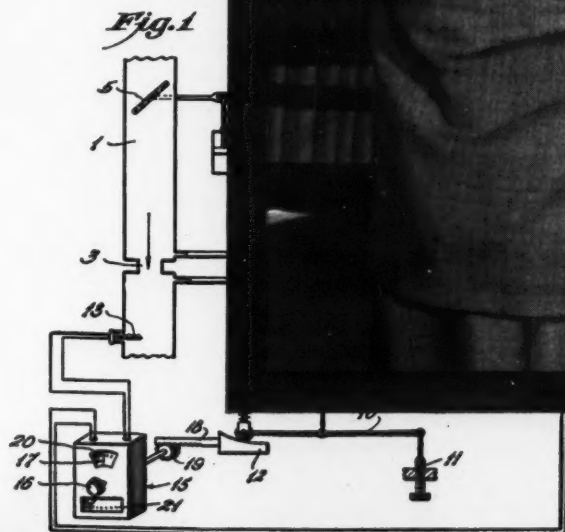
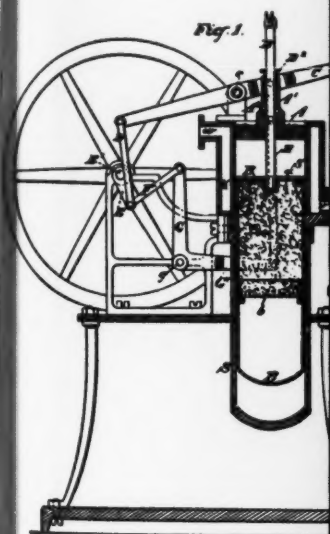


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For Men Who Manage

MAY 1957

chemical processing



PATENTS— DO THEY CREATE 'MONOPOLIES'?

GEORGE E. FROST
 noted patent attorney
 gives an emphatic NO
page 10

General Chemical Expands Nitric Acid Production

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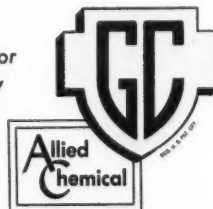
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INTERESTING**



Seaweed

A major potential source of chemicals has become recognized — seaweed. Chemical-industry use of seaweed-derived colloids (fine-particle suspensions used as thickening or gelling agents) is rising rapidly. Sales in 1955 were about \$2 million; projected level for 1957 is \$20 million. (*Industrial Bulletin*, Arthur D. Little, Inc.)

From strange beginnings

Hog livers, crab shells, tree bark, oysters, and the innards of Columbia River salmon are raw materials of a thriving business at Krishell Laboratories Inc., Portland, Ore. Company transforms these odd commodities into small quantities of rare chemicals for major pharmaceutical houses. (*Wall Street Journal*)

Bonding film airborne

Bonding film replaces rivets for bonding aluminum to aluminum in fuselage, wings, and tail assembly of a supersonic B-58, newest Air Force bomber. In addition to providing greater strength for primary structures, film makes possible substantial weight saving and more efficient air-frame manufacturing procedures.

A current problem

The proposed earth satellite, traveling at about 18,000 mph, will cut through the earth's magnetic field so rapidly that substantial electrical currents will be generated in the metal shell. Recording instruments will be shielded, but the extent to which currents will affect radio transmission from the satellite is not known. (*Industrial Bulletin*, Arthur D. Little, Inc.)

(Please turn to page 239)

When inquiring check 3187 opposite last page

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 20

May 1957

No. 5

CHEMICAL PROCESSING Magazine serves
American industry wherever chemicals and chemi-
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MAY 1957

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CORROSION

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chemical processing

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THIS MONTH'S COVER

... portrays George E. Frost, partner in Chicago law firm of Frost & Verhoeven, against a background of the many law and technical books necessary to his practice as a patent attorney. Mr. Frost's enlightening article on the patent-antitrust controversy (page 10), a problem currently being studied by Congress, clears up many points on this timely subject.

The CP Staff photograph is shown against a backdrop of typical patent drawings. (Thanks to Allis-Chalmers Mfg. Co. and Askania Regulator Co. for the drawings.)



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- The product directory, pages 249 to 252, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page



over
the editor's
shoulder

What is an editorial advisory board?

Who serves?

How does it function?

These and other questions may have entered your mind when this group has been mentioned in times past.

CHEMICAL PROCESSING's Editorial Advisory Board is made up of men who by virtue of education, training, and experience have achieved stature in the chemical processing field. These men come from diversified organizations in that field. Their active interests are as broad as the field itself . . . research and development, engineering, product development, processing.

This group serves with us as a *working* Board and meets at regular intervals. At these meetings, current developments, problems of the field, and other subjects are discussed. The magazine's editorial content . . . past and future . . . is appraised, criticized, and planned.

For example, some of the newer sections in the publication have been started as a result of these discussions with our Editorial Advisory Board. The Corrosion Control section, which appeared for the first time four years ago, is one example. Others include the Laboratory section and Safety section.

In this issue you will see examples of articles that stemmed from the discussion held in our last Board meeting.

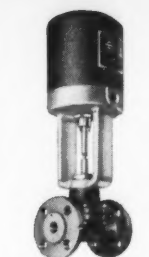
The article discussing our patent system, appearing on page 10 of this issue, was originally suggested at one of these "brainstorming" sessions. Another, describing the "probability budget," appears on page 15. Other articles appearing in this issue also were inspired by the members of this editorial advisory group.

In the future you'll see more articles dealing with broad, sometimes controversial, problems relating to engineers', chemists' and management men's problems. Our Board has registered an emphatic approval for this type of material.

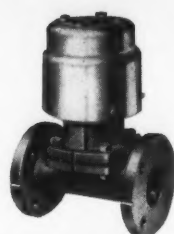
Every issue of CHEMICAL PROCESSING reflects the activity of the Editorial Advisory Board complementing the training and experience of the chemical engineers, chemists, and journalists who serve on the full-time editorial staff of CHEMICAL PROCESSING magazine.

John C. Vaaler

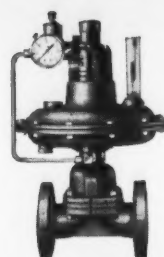
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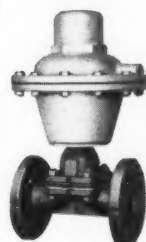
Fisher Governor



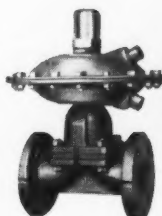
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Reversible Stabilflo



General Controls
Hydramotor



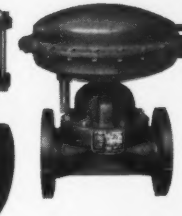
Grinnell Air Motor,
Spring Loaded



Grinnell Air Motor,
Double-Acting



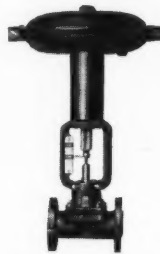
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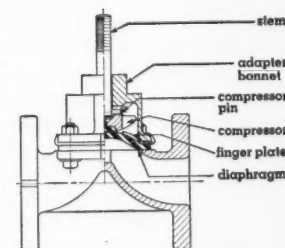
G RINNELL-SAUNDERS Diaphragm Valves are easily equipped for power operation — by combining any of numerous power operators, a sliding stem bonnet assembly, and a valve body. The sliding stem bonnet can be modified to accommodate any make of power operator, pneumatic or electric.

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Repeat Performance in Long Beach

Here's how SWECO after-coolers helped a big-city public utility meet the booming fuel needs of homeowners and industry.

More meals to cook, more homes to heat, new industry to serve. Those were the growing pains that challenged the Long Beach (Calif.) Municipal Gas Department in 1949. How Long Beach solved the problem is told in the efficient performance of four SWECO after-coolers that are currently processing 48,000,000 Std. cu. ft. of natural gas each day in a round-the-clock operation at the city's new Spring Street Compressor Station.

Each SWECO unit exchanges 2,422,000 B.t.u. per hour. Gas from the compressor enters the shell side of each after-cooler at the rate of 24,625 lb. an hour — and at a compression-developed temperature of 255°F. Cooling water in the tube bundle drops this temperature to 75°F.

Heart of system

The compressor station is the heart of a distribution system that depends on a constant, rigid level of pressure to push the gas through a network of lines to consumers. Pressure drops cost money. The plant's four SWECO heat exchangers keep pressure drop well within a tight specification of less than one pound per square inch.

Repeat performance

It was back in 1949 that the Municipal Gas Department ordered its first pair of big, custom-made SWECO after-coolers. But in just six years, even their peak processing performance of 24,000,000 Std. cu. ft. of natural gas every 24 hours proved inadequate. The gas department built a new plant, moved in the original two SWECO-built after-coolers, and went back to SWECO for two more units.

Common denominator

In ordering its second pair of after-coolers, Long Beach joined an impressive list of repeat buyers of SWECO heat exchangers. All have this in common: the need for reliability.

That's why the process industries keep coming back to SWECO... for the design and manufacture of *process equipment*... for a full line of *vibrating screen separators*... for *engineering and construction services*.

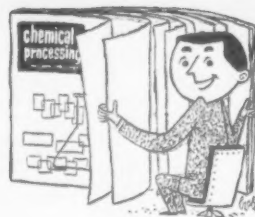
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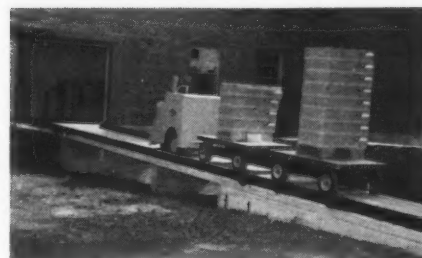
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*looking ahead
to next month...*



Robot tractor transports paper products over a 700-foot course

What? No operator?

That's right! This tractor is pulling a train of trailers without need for a driver. It is guided by radio waves emitting from a wire imbedded in the floor. It goes up and down ramps, in and out of doors, and operates in all kinds of weather.

Next month, *CHEMICAL PROCESSING* tells how Beckett Paper Co., Hamilton, Ohio, uses such an operatorless tractor to carry packaged papers back and forth between shipping department and warehouse — a distance of some 350 feet. Like many long-established companies, plant layout was such that they could not simply install a regular conveying system. The tractor has allowed Beckett to adapt modern material handling methods to their plant.

New use for a new material — a photo report of technical service

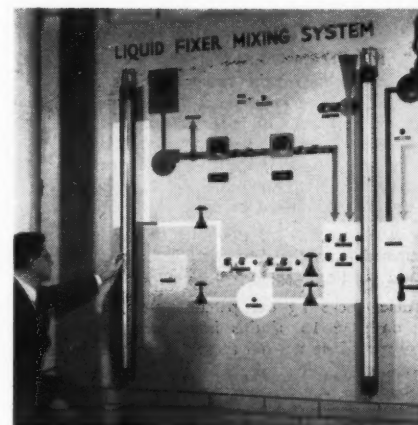
Next month's Chemical Materials section tells how a typical "small business" is aided by DuPont's customer service lab. Some time ago, the Moreland Corp., producers of rollers for industrial use and printing equipment, needed a rubber roller face that would stand up under increased heat produced by high-speed operation.

Kenneth F. Quinn, Moreland's Chief Chemist, had heard of a new material that DuPont was at that time "playing" with: Hypalon. At the suggestion of DuPont's technical service representative, Quinn took

his troubles to the company's Elastomers Laboratory, just west of Wilmington, Delaware.

Working together on the project, the two companies ironed out the difficulties, compounded a roller material that would process easily and stand up well under temperatures as high as 350°F.

June's *CHEMICAL PROCESSING* will contain a photo report of the men, equipment, and labs — both at DuPont and Moreland — which were essential to this story of technical service in action.



From the mixing system's control panel on the fourth floor, Lemoyne D. Bearden of Kodak's powder and solutions department checks liquid level of holding tank in building's basement

A custom installation — but built with standard components

The Engineering Division of Eastman Kodak was asked to increase productive capacity of a mixing operation located on the fourth floor of an already overcrowded building. Only available space was in the building's basement. Personnel had to remain on the operating floor to oversee other equipment.

Here's a quick preview
of features you'll find
in June CHEMICAL PROCESSING

They worked it out by putting the mixing equipment in the basement, where floor-loading was no problem. A "customized" control system was designed which allowed operating personnel to remain on the upper level — and they did it using only standard commercially available control equipment.

In next month's Instrumentation and Control section, Engineer Sam Russell at Kodak Park and Assistant Editor Bill Clarke outline the "hows" and "whys" of Eastman's solution to a problem that almost everyone faces at one time or another — effective use of space for expansion without using specialized control equipment.



Cars are loaded at Dow without use of fork trucks or other mobile equipment

Weighs soda ash without bridging

Next month's Packaging and Shipping section tells how Dow Chemical, at its new soda ash operation in Freeport, Texas, handles material from bagging to carloading — all automatically.

System permits automatic handling of 16 100-lb bags per minute on a continuous basis. No lift trucks or other mobile equipment are needed for loading boxcars.

Associate Editor Gordon Weyermuller visited Dow's new plant, talked to W. S. Chenault, Plant Superintendent, Soda Ash. You'll find the story in June's CHEMICAL PROCESSING.



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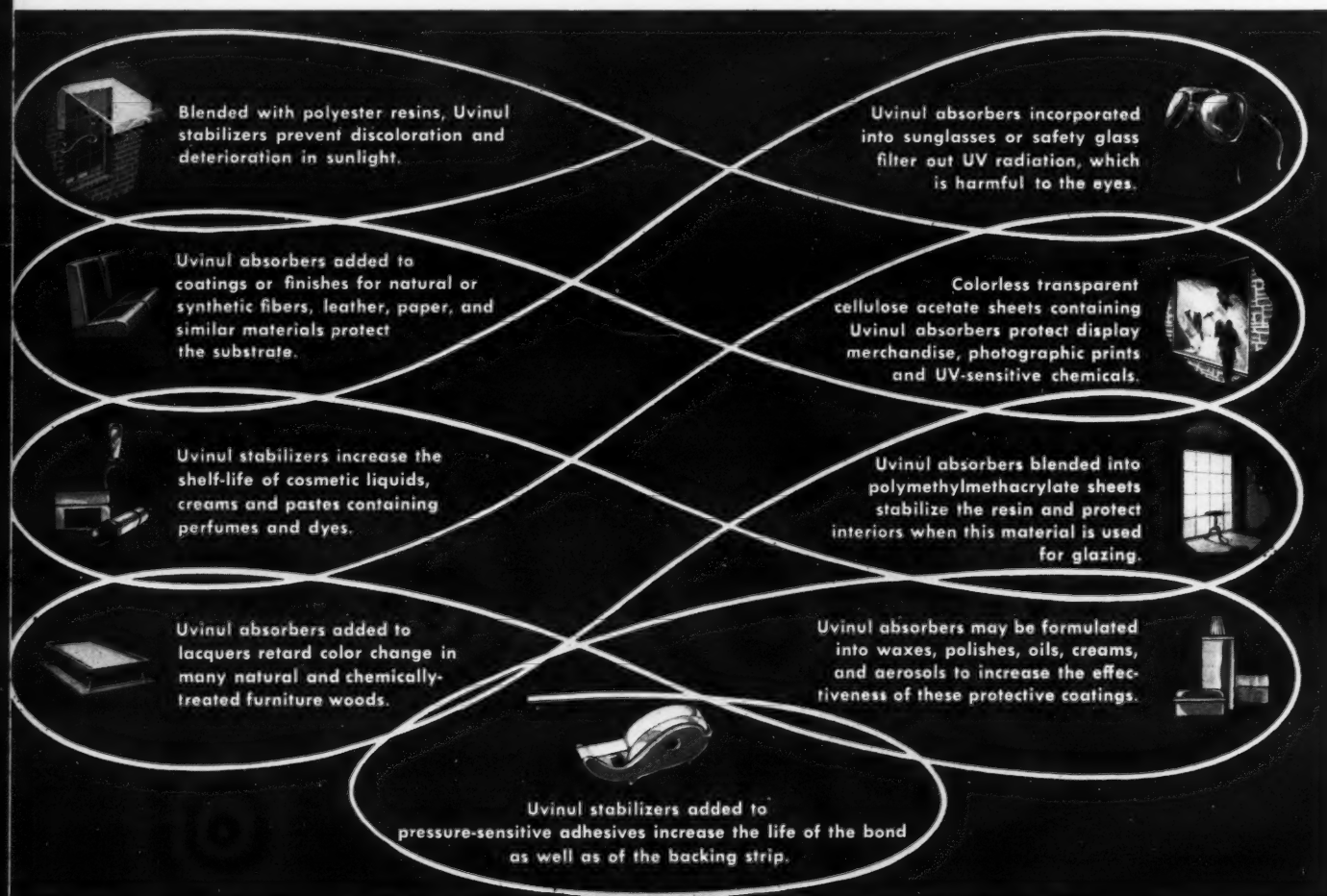
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Thomas C. Fetherston joined Union Carbide as sales correspondent for Linde Air Products in 1919. He later became correspondent and salesman in the Philadelphia district. He helped organize Linde's Technical Publicity department and finally the Public Relations department for Union Carbide.

Mr. Fetherston has been a member of the Board of Education, Oceanside, New York, since 1934, and President since 1937. He was recently elected President of the New York State School Boards Association.

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Selling Students on Science

THOMAS C. FETHERSTON

Assistant Director of Public Relations
Union Carbide and Carbon Corporation



The science-based industries, particularly the chemical industry, are understandably concerned about the probable supply of competent and enthusiastic chemists, engineers, and scientists in the years ahead. It is fundamental that if the number of college graduates in these fields is to increase as it should, more students must become interested in science in the elementary and junior high school grades. This interest must be so intense, and preparation must be of such quality, that the student's enthusiasm will be maintained throughout eight or nine years of secondary school and college education.

It is axiomatic that a student will not undertake the tough courses in mathematics and science in high school and college unless he understands and appreciates the rewards and satisfactions that can accrue from careers in these fields. This points to the necessity of working with the schools, in whatever

ways are appropriate and acceptable to them, to bolster their activities in the fields of science and mathematics, and to help in their career guidance programs.

Industry has an opportunity, in fact an obligation, to make available to the schools practical understandings of the American economics system and of American industry. And educators generally are anxious to enrich their curricula with experience outside the classroom and beyond the textbooks. They feel that the student will do better work in science if he understands something about the practical applications of science. This can be accomplished by relating the abstractions of the classroom to the finite and concrete manifestations of science and of industry that the student can see around him in his everyday life.

Many educators also feel that in order to help their

students to the greatest degree in finding their proper place in the world they must improve their career guidance programs. It is difficult for a professional educator at the teacher level to have much first-hand understanding of the real nature of career requirements and opportunities in the multitude of fields that are open to young people these days. As a consequence, they deal largely with theoretical concepts. This is another area in which educators welcome the cooperation of industrial people.

Here is the problem. How can we help?

A solution to the problem involves finding people in industry who feel that they can or would like to help, and then letting the school systems know of the availability of cooperation. It's best to approach

(Please turn to page 235)



George E. Frost, patent attorney in the Chicago firm of Frost & Verhoeven, received a BS in electrical engineering from Illinois Institute of Technology in 1940, and his law degree from George Washington University in 1945.

Besides being active in various bar association activities, he is also Director of Patent Division of the Lawyers Institute, and instructor in Substantive Patent Law, Antitrust Law, and Unfair Trade Practices at John Marshall Law School. In recent years, he has participated in symposiums and conferences held on the subject of patents and related matters.

From 1953 to 1955, he was a member of the Attorney General's National Committee to study Antitrust Laws. His views covered in this article are presented in detail in "The Patent System and the Modern Economy, Study No. 2, prepared for the Subcommittee on Patents, Trademarks, and Copyrights, US Senate."

What does the patent system really accomplish? Is it in conflict with a competitive economy? Does it create "monopolies"? Is it inconsistent with the antitrust laws? Is it "archaic" — as some have suggested?

These and other questions relating to the patent system are currently the subject of inquiry by a subcommittee of the Senate under the leadership of Senator Joseph C. O'Mahoney. Pointing to inadequacies and anachronisms in present patent law and practice, this group has laid out a broad program of study with the end in view to find workable solutions to current patent problems and secure the legislation required to effectuate these solutions.

Evaluate the present — not the past

Concurrently the system is being studied by private groups, notably the Patent, Trademark, and Copyright Foundation of the George Washington University. It is accordingly both timely and important

to take stock of the place of the patent system in business today and to evaluate the operation of the system with respect to the competitive process.

In its inception the patent system was directed to the activities of the individual inventor. The stumbling efforts of the mechanical tinkerer and the unguided experiments of the home chemist were then the sources of technical progress. Today the emphasis has changed. The patent system now operates in a dynamic research-centered economy where the application of the scientific method to the arts of both war and peace is a necessary ingredient for world leadership and national survival. But the fact of this change is neutral. It does mean that any meaningful analysis must emphasize the present and not dwell on the past. In like measure, attention must be directed to the normal operation of the system and not to the abuses that have received disproportionate notoriety.

American economic public policy is based on a general rule of freedom to compete in the manufacture

"There is no conflict between antitrust laws and the patent system," says George Frost. "Each in its own way stimulates competitive effort." Some of us have fallen into the notion that patents are antagonistic to competition, but in reality. . .

PATENTS STIMULATE COMPETITION

GEORGE E. FROST

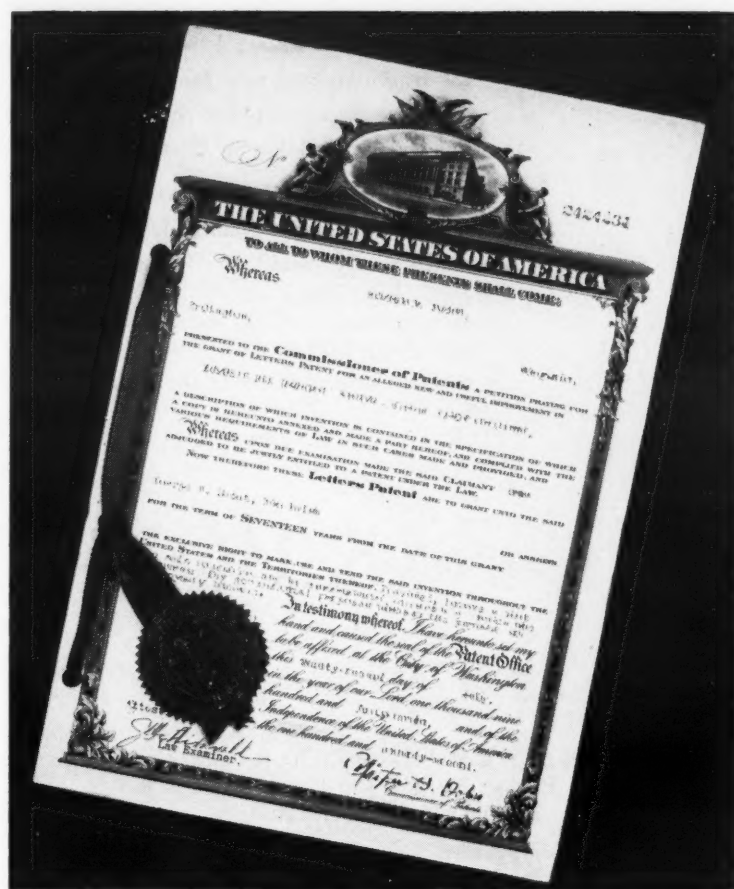
Partner
Frost and Verhoeven, Lawyers

of any product and in the use of any process. The assumption — generally valid — is that when restraints on competition are eliminated, normal economic forces will give rise to the desired highly competitive order. To have meaning, however, this competition cannot be confined to price, or to sales and production technique.

Patent system — key to competition

Rather, it encompasses all phases of business activity. In particular, it includes the conception and development of the new products and processes that are so conspicuously a part of current business.

It is in this new product and process competition that the patent system finds its place. Its relationship to the antitrust laws is brought out by the "Cellophane Case" decided by the Supreme Court last year. There DuPont was accused of violating Section 2 of the Sherman Act because of an alleged "monopolization" of the cellophane business.



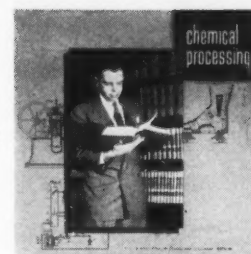
Over a period of years, DuPont sold about 75 percent of the moisture-proof cellophane in this country and licensed the remainder by reason of a product patent. Nevertheless, the Supreme Court held against the Government — on the ground that the competition of Glassine, waxed paper, aluminum foil, Pliofilm, polyethylene, Saran, and other flexible packaging materials precluded the existence of monopoly power required for alleged violation of the Sherman Act. In short, the Court found that the competition between rival products, each having its own advantages and disadvantages but with the same general end-use, served the same end as competition between identical products.

The importance of the Cellophane Case lies in its direct holding that the rights enjoyed by DuPont in connection with the moisture-proof cellophane patent (as well as other cellophane patents) were entirely consistent with the presence of competition — and that product competition was consistent with anti-trust-law standards of monopoly.

We can also turn to other cases for illustrations of the place of patents in competition. In 1940, Anthony patent 2,198,423 was issued to Ray-O-Vac Co., then a comparatively small manufacturer of dry cells for flashlights and other uses. The patent included broad claims to a dry cell with a "protecting sheet-metal sheath . . . tightly embracing" the cell proper to prevent leakage. Despite its simplicity, the battery was a marked break from past thinking. Previously, both the industry and users had accepted the propensity of exhausted cells to swell and leak — as indeed most persons know from sad personal experience. Most manufacturers had applied notices to their flashlight batteries warning of this effect.

The Anthony patent went far in overcoming this problem. Indeed, Ray-O-Vac was able to advertise the new battery as "leakproof" and to guarantee replacement of the entire flashlight if damaged by a leaky cell. The battery was an immediate commercial success. When a competitor adopted the patented construction, Ray-O-Vac brought a patent infringe-

COVER



STORY

ment suit which ultimately resulted in a 1944 decision of the United States Supreme Court affirming the lower court holdings that the patent was valid and infringed. Ray-O-Vac issued no licenses, and realized its profits from the manufacture of the patented cell, both for sale under its own name and for private-brand sale.

Competition by non-infringing products

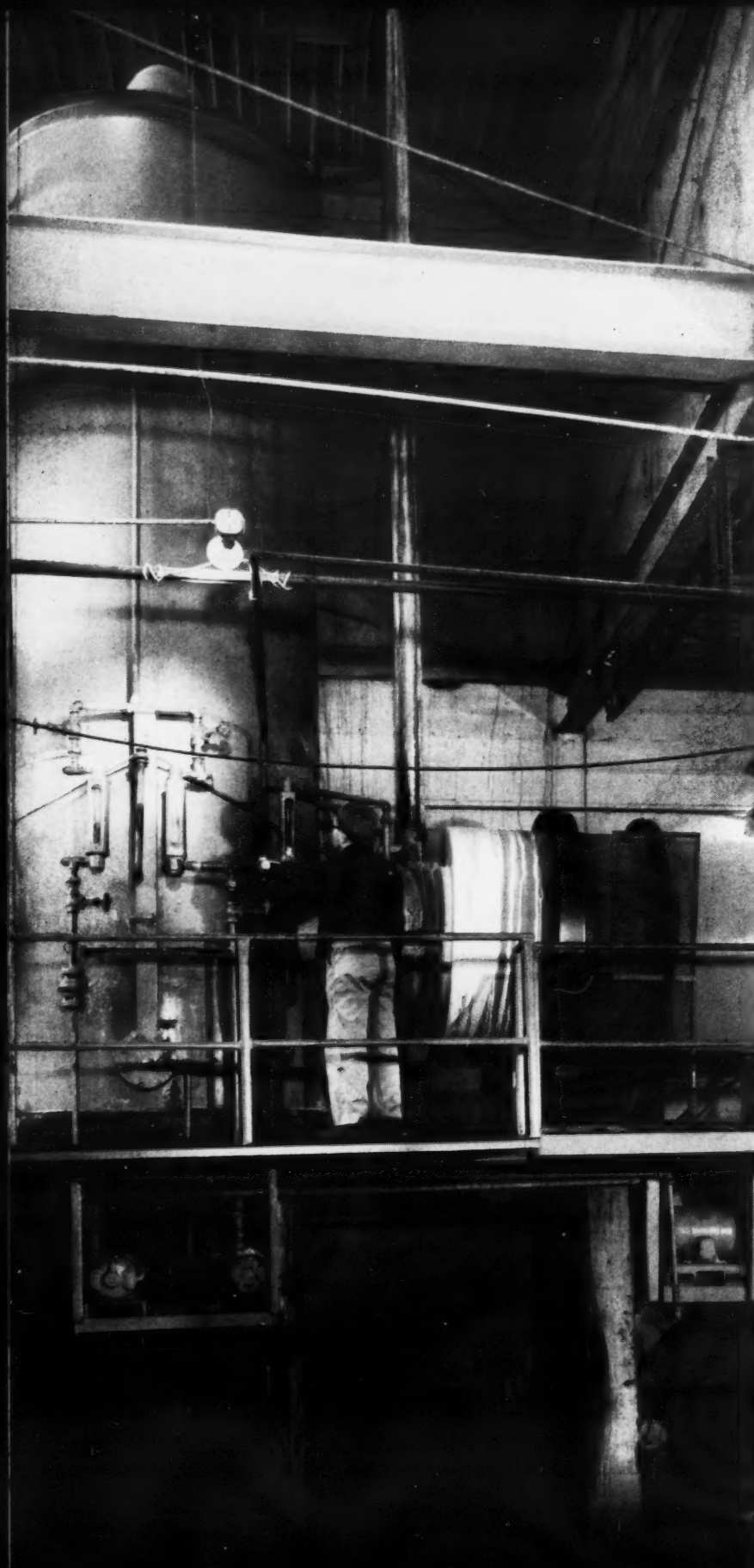
The net effect of the Supreme Court decision and the Ray-O-Vac policy was to create a crisis in the industry. Ray-O-Vac competitors faced an important patent to which they could not gain access. Hard-pressed, they turned their attention to the development of non-infringing batteries which they could advertise as leakproof. By 1948, one of the defendants in the litigation had such a battery in quantity production. Another competitor had a battery on the market in 1950, for which it gave the same flashlight replacement guarantee that had been emphasized by Ray-O-Vac in obtaining the patent from the Patent Office and before the courts in securing a favorable decision.

Throughout, there has been vigorous competition and effective selling by all manufacturers. There has also been vigorous research competition directed to battery improvement. When Ray-O-Vac contended that its term "leakproof" was distinctive of its batteries, competitors satisfied the Patent Office that this was not true.

Ray-O-Vac has moved up in the industry upon the strength of one of the conspicuously successful patents of recent years. Nevertheless, it has not enjoyed any broad-range freedom from competition. And now — with the patent expiring this year — the company faces not only competition based on improvements made by others to design around the Anthony patent, but also from other manufacturers who choose to use the patented construction.

The chemical industry provides a rich fund of additional illustrations of vigorous research and new product and process competition. Various phases of

(Please turn to bottom page 241)



Although, today, defense and classified uses account for more than half of all domestic lithium consumption, the remaining 8000 tons for peacetime uses represents five times the total production in 1951 and over twenty times that of 1943.

In 1943, lithium was little more than a curiosity. The major product was lithium chloride, which was converted to the hydride for the sole customer, the US Government. There were also some minor civilian uses.

The story of the growth of this compound can be best told by the story of one of the companies that produces

HOW WE BU

WALTER M. FENTON, *Vice President*
Product Research and Development
Lithium Corporation of America

This isn't the first success story ever told. We've been reading them since childhood when we probably thought that "living happily ever after" was all that was necessary to success. But this story does differ from many stories you may have read in that the path upward was not straight and not easy.

Even though we had many "brilliant ideas," we found that when put forth in a Procrustean world, many of them met with grief and proved unsuccessful — temporarily, at least. Although I'm sure the writers of "success stories" might like to hear a different version, what follows is the hard truth — as it happened.

'Way back before 1942, while the war was just getting warm, the immediate ancestor to Lithium Corporation was formed. Known then as Metalloy Corporation, we produced only one product: lithium chloride . . . and not very much of it, either. This we sold to a contractor who processed it into lithium hydride which in turn was all purchased by the government.

As the war progressed, it didn't take a lightning bolt to make us realize that if our company was to survive after the war ended, we'd better get hustling in developing commercial markets.

◀ Equipment for processing lithium chloride is located at company's St. Louis Park, Minnesota, plant, as are the other operations depicted here

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it — their dramatic growth from "very humble beginnings" in 1943 to annual sales of more than twelve million dollars in 1956 smacks of Horatio Alger. But the upward climb was not a rose-strewn path; it was beset with trials and failures, as well as successes.

Walter M. Fenton, Vice President of Research and Development for Lithium Corporation of America, is in a good position to tell us this story. He has been with Lithium Corporation since 1943, and has contributed in a large measure to the success of this venture . . . but let's pause and let Mr. Fenton tell us the story in his own way. The story of . . .

BUILT MARKETS FOR LITHIUM

Back in those days, the major market was for lithium hydroxide, which was used to prolong the life of Fe-Ni storage batteries, and experimental government projects that were hoping to develop a multi-purpose lubricating grease. Lithium chloride and fluoride were used in relatively small amounts in brazing fluxes, the chloride and citrate were used in soft drinks, and the chloride was used for humidity control in an air conditioning system.

In 1943, Metalloy undertook an extensive market development program aimed at studying present uses in the chemical industries, air conditioning, and greases, as well as evaluating potential uses in the ceramic and metallurgical industries. Since the end of the war, this program has been supplemented by an active advertising program in the trade papers which aims at stimulating thinking on new applications for lithium and its compounds.

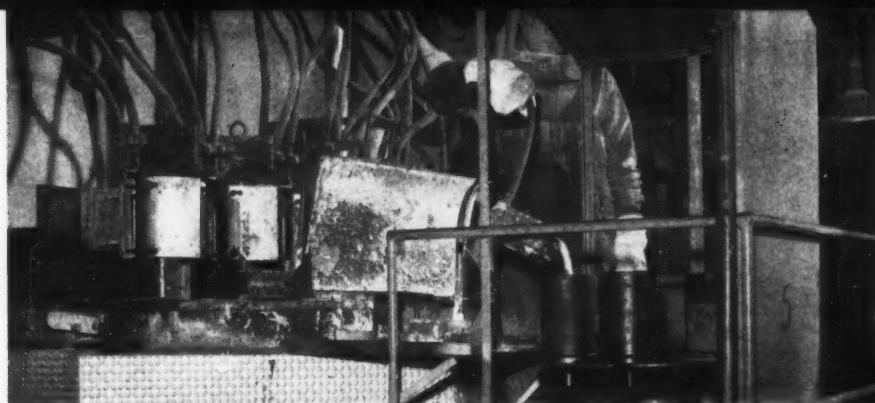
Ceramic Uses

An extremely limited budget confined our initial efforts mainly to searching the literature and talking with research and production personnel in various industries throughout the country. Our first spadework turned up the ceramics industry as being of prime interest.

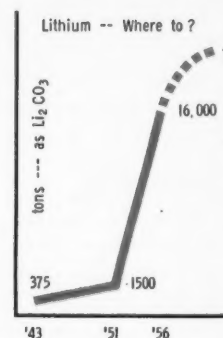
The glass industry looked promising if prices of lithium compounds could be reduced or if lithium ores were purified. However, this industry to date has been quite hesitant to utilize lithium compounds.

Because of the toxic properties of lead compounds, investigators had recommended the use of lithium in pottery glazes. However, the industry was reluctant to change over from lead to lithium, or in short, to depart from long-accepted techniques.

Part of one of the banks of electric furnaces in the metal plant



Pouring molten metal from cell into molds



The third branch of the ceramic industry looked more favorable. The porcelain enamel people had a number of problems caused by steel shortages. Because of the fact that firing temperatures were in the range of 1550-1600°F, and the only steel easily available warped at temperatures about 100°F below this, the demand was for lower-firing enamels.

But before lithium could solve the problem, our research personnel had to come up with some new compounds which corresponded to the heavier metal oxides then in use. For example, as a replacement for B_2O_3 we developed LiBO_2 ; for TiO_2 , Li_2TiO_3 , and so on through the entire list of "ceramic oxides." A lithium manganite was developed to replace MnO_2 in a groundcoat

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HOW WE BUILT MARKETS FOR LITHIUM (Continued from preceding page)

(undercoat). It was found that this coat had the exact coefficient of expansion needed, and was highly resistant to thermal shock.

After moving on to the large-volume market, namely appliances, we found that industry traditions were against a change, so we didn't press this further, although we believe that some day there will be a big market here.

With frit manufacturers, however, the story sounds better. We worked with them in developing superior finishes, and today this is a tonnage market.

So, too, was our experience with makers of sinks, bathtubs, and laboratories. Reduction of temperature wasn't as important to these people as was the increase in rate of application which lithium compounds permitted. Adding 1 to 2% lithium carbonate to the enamel frit permitted putting a *hard* enamel (one that wouldn't stain if the faucet leaked) on a casting in one application instead of two — thus cutting this time right in half. Although the market is big today, there is still a big potential for more development.

Today, ceramic uses account for several million pounds of Li_2CO_3 annually.

Metallurgy

The metals industries were then investigated. A logical starting place for work appeared to be in welding rod coatings, as some use had already been developed in aluminum brazing fluxes and to some extent in aluminum welding rods. This is a long range project however, and development is still underway. The future looks promising.

Use of lithium in heat treatment of steels was then studied. We worked with a number of furnace manufacturers and steel makers, in hope of proving that lithium compounds aided in the heat treating of steel. However, this was not to be, at least not in atmospheric furnaces, so we shifted our emphasis to the use of lithium in salt baths.

We were more successful here, theoretically, at least. Two systems were discovered that looked promising: a mixture of the nitrates of lithium, potassium and sodium, and a mixture of lithium, potassium and calcium nitrates. The first had a tertiary eutectic of 119°C , and the second of 117°C . Except for one tonnage use, details of which are "classified," not much else happened to this development until recently, when there seems to be a revived interest. Perhaps another decade will see increased use of lithium salts in treating baths.

Scavenging and degasification of copper and its alloys was a promising application. Thirty years before our investigations, German investigators found that lithium helped to remove occluded gases from copper alloys to give sounder castings. Although this was during World War I, the intervening years had not seen a satisfactory method of adding the small quantities



WALTER M. FENTON

Appointment on January 1st of this year of Walter M. Fenton to Vice President of Product Research and Development for Lithium Corporation of America did not come as a surprise. It came in recognition of the growing importance of these functions in his company, as in all industry, and as brought out by this article.

Prior to his appointment, Walter Fenton was Director of Product Research and Development, a duty he still executes. Before this he was Sales Manager, in which capacity he joined the company in 1943.

Previous to his association with Lithium Corporation, he was Manager of Baker and Adamson Division of Allied Chemical and Dye's General Chemical Division. He had joined that company in 1927 after completion of his education at Rhode Island State College and Philadelphia Textile School.

Mr. Fenton is a member of the ACS, American Ceramic Society, Minnesota Industrial Chemists Forum, Minnesota Federation of Engineering Societies, Commercial Chemical Development Association, and the American Rocket Society.

of lithium to the melt (about 2 gm/100 lb copper).

Originally, a 1 to 2% lithium-in-copper alloy was introduced for this purpose, but wasn't too satisfactory since it was not a true alloy. About the time we changed our name to Lithium Corporation . . . that was in 1947 . . . we developed an idea that made it a cinch: In order to make the lithium easy to handle and weigh, we filled copper refrigerator tubing with lithium. It was then crimped at specified lengths to obtain weights of $2\frac{1}{4}$, $4\frac{1}{2}$, and 9 grams. (A $2\frac{1}{4}$ -gram cartridge degasifies 100 lb copper.) Our company sold enough of these cartridges to degasify over ten million pounds of copper in 1956 . . . chalk up a medium-sized "X" on the Success side of the ledger.

Our attempts to gain a market for lithium as an addition element to iron and steel didn't prove out. . . we couldn't come up with any definite proof of improvement. This use wasn't developed further . . . even when Dr. De Sy discovered in 1950 that lithium contributed to nodularization of cast iron. (Nodularization, the metallurgists had found out, gave cast iron increased tensile strength and flexibility. Now they were looking for ways of producing this effect.)

Lithium Corporation expanded the work of De Sy and discovered something not foreseen in the original work. De Sy had been working with high-purity iron, not commercial grades. We found that commercial grades had a relatively higher sulfur content, and that sulfur combined first with the lithium leaving very little available to do the nodularizing. It was uneconomical to increase the amount of lithium to overcome this. Here, too, was another blind alley.

Air Conditioning

Although some lithium chloride and lithium bromide were already in use in certain air conditioning processes, we felt we could expand the market here.

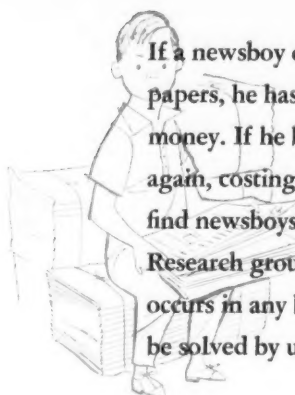
One big problem which, if overcome, would increase the desirability of LiCl , was its corrosiveness.

We worked with one of the principal companies in the field to prove out suitable inhibitors, which are now used, and which have contributed to the increasing popularity of this type of system, thus opening a substantial market for lithium compounds. In the meantime, the development of the gas absorption type of air conditioning based on lithium bromide was moving rapidly ahead. We worked on the development and shared in the benefits.

Lubricating Greases

Lubricating grease compounding was a field in which much development work was underway during the war and in which we cooperated to a limited extent. The government was especially interested in multi-purpose greases since military operations extended from the Arctic to the tropics.

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If a newsboy on the corner buys too many papers, he has stock left over — costing him money. If he buys too few, he loses sales — again, costing him money. Of course, you'll find newsboys pretty rare among Operations Research groups, but the same sort of problem occurs in any business. And it can best be solved by use of . . .

THE PROBABILITY BUDGET . . . a closer look at your future

R. W. CRAWFORD

*Manager of Business Research
Plastics Division
Monsanto Chemical Company*

The Probability Budget is a new management concept developed to better enable the business man to calculate his risks and make budget decisions to maximize expected profits. The Budget, made practicable by the advent of electronic data processing equipment, includes the variability of past forecasts or a revised variability if it is expected to change. It includes the costs incurred if actual sales are not as large as expected. It includes costs which are incurred if the opportunity of making sales exceeds expectations.

The Basic Problem

The basic budget problem is to set up a system which will enable a business to forecast the future, lay out programs which seize the opportunities, and maximize the resulting profits from these.

There are a number of causes for uncertainty with a manufacturer of raw materials. Final demand in the economy cannot be forecast with certainty. The level of ultimate retail sales depends upon consumer psychology and disposable income. The level at which ultimate consumers will invest in housing cannot be forecast with certainty. Nor the level of business expenditures for new plants and equipment. Government purchases are uncertain, and may depend upon decisions which have not yet been made.

Even if these levels in final demand were certain, pipeline surges take place

Robert W. Crawford was graduated from Amherst College in 1937 with a BA in mathematics. He received his MBA from Harvard Business School in 1939.

He joined Monsanto in 1939 as a member of the sales department. He held posts in product development, technical service, and sales research.

Mr. Crawford now holds the post of Business Research Manager for Monsanto's Plastics Division.



between that demand and raw materials. These surges cannot be forecast accurately.

There is uncertainty in respect to your competition from products of other industries and uncertainty regarding the participation by your company in competition with other companies.

Basically, a budget can be used for two major purposes: for planning or programming and for measuring performance. For planning or programming conventional methods have been inadequate. Our concern is in these areas.

Conventional Solutions and their Difficulties

The conventional solution is to set up a sales budget and program business operations from it, costing the various programs. To the extent that a single-valued level of sales is used, the budget is an approach based on the assumption that actual sales will be the same as budgeted sales — or, that the future is certain. The method fits business operations in which the future is certain, but that is generally not the case.

Another approach in programming is to set up several levels of sales for the future, each to be used for a different decision or program. For example:

(Please turn to next page)

A sales quota, a sales forecast, a sales budget, a sales par, and a sales standard might each be developed for a different decision or program. This approach is at best an improvisation. And it still does not give us an answer to the uncertainty.

In contrast to these conventional solutions, let us next describe the Probability Budget. For purposes of analysis, divide the subject into:

- Mathematical expectation approach to forecasting
- Conceptual mathematical approach to programming

Mathematical Expectation Approach

The mathematical expectation approach introduces probability into the sales forecast. The sales forecast takes the form of a frequency distribution.

Our experience shows that the only way to effectively handle sales uncertainty is to make every forecast a frequency distribution. If you are not familiar with the term "frequency distribution" look at chart A. The vertical axis is probability. The horizontal axis is the sales forecast level for the period budgeted. The continuous bell-shaped curve shows the probability associated with each level in the forecast. The area under the curve is directly proportional to probability and total area equals total probability of one or certainty. Once your forecast is set up in this form, the mathematics of probability can be applied.

We call this sales forecast the "probability distribution of expected sales." You will note that the probability distribution concerns sales expectations alone and in no way indicates at what level a single valued decision or program will be made.

By its very nature it also does not indicate exactly where actual sales will fall. For any single period or decision the actual value of sales may fall any place on the curve. Single decisions made in relation to this distribution and considered alone may be good or bad depending upon how the single actual value turns out. But, when this budgeting process is repeated time

and again for every product, and for every budgeting period, this approach gives the businessman the lowest average cost for all decisions.

The conversion of future uncertainty into the probability distribution of expected sales involves these steps:

- It must begin with the concept that the future is uncertain.
- Knowing this, we invert this uncertainty and talk in terms of probability.
- The probability of each event taking place in the future must be quantified.
- By assembling all the quantified probabilities for each future event, a probability distribution of expected sales is developed in which total probability adds up to one when all probabilities are included.

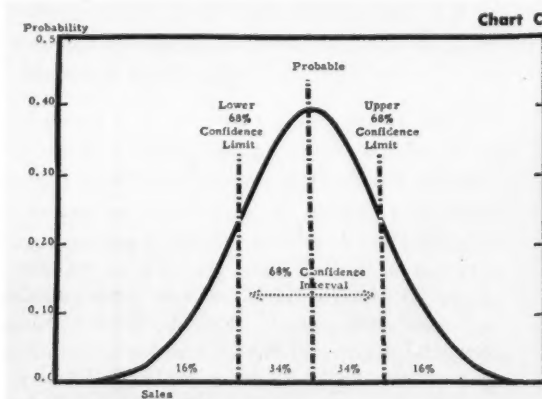
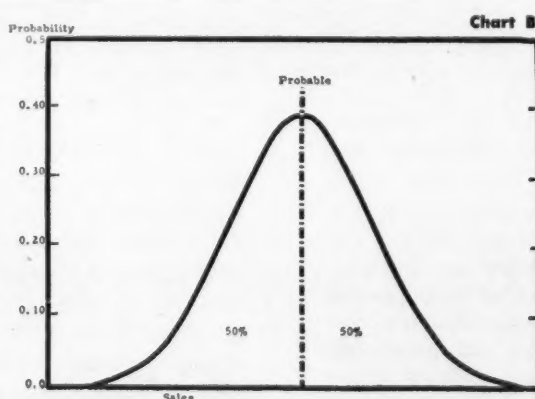
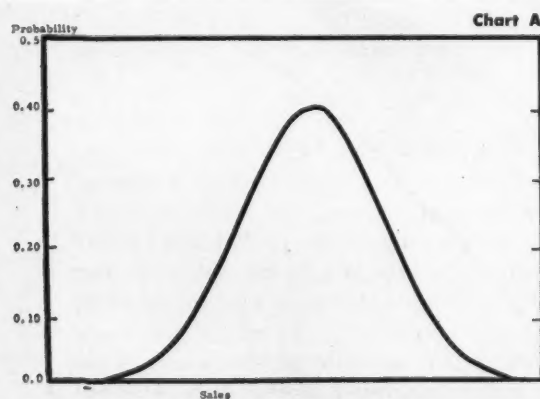
In order to simplify the discussion so that it can be handled here, let us assume that the particular distribution with which we are dealing is one of normal shape, the bell-shaped curve.

Game theory can be applied to the game of business, just as in poker. Neither the poker player nor the businessman knows exactly what cards or what business conditions will be dealt him. Both know what cards are in the deck. Both are uncertain as to what cards a competitor may have in his deck relative to his own cards. The poker player knows who is in the game by looking around the table. The businessman knows today but is uncertain as to who will jump into his industry in the future.

Returning to the "probability distribution of expected sales", let us insert a line in the center of the curve as shown in chart B. We shall call that line as "The Probable." *The probable is defined as that level of expected sales which actual sales are expected to exceed 50 percent of the time and which actual sales are expected to fall short of 50 percent of the time.*

Having set "The Probable," our next step is to measure its dispersion or width. This is measured by its standard deviation which is related to the probable by the coefficient of variation. This coefficient is defined as the standard deviation divided by the probable and may be expressed in percent. The coefficient of variation and the probable define the probability distribution of expected sales.

Chart C shows graphically the relationship between the probable, the standard



PROBABILITY DISTRIBUTION OF

deviation, and probability. The 68 percent confidence interval corresponds with the area covered by the probable \pm one standard deviation. This interval is represented by the area between the two lines equidistant from the mean probable. If each segment of the distribution is to be taken separately, the area at the left of the lower 68 percent confidence limit represents 16 percent probability. The area between the lower 68 percent confidence limit and the probable represents 34 percent probability. The area between the probable and the upper 68 percent confidence limit represents 34 percent probability. For a normal distribution it is then possible to delineate the probability distribution of expected sales by stating the probable and the coefficient of variation.

The "Probability Budget" will have the sales level expressed as the probability distribution of expected sales. More specifically, the sales volume level for each product will be expressed in terms of a probable and a coefficient of variation. The next question is how to arrive at the probability distribution of expected sales for each product for each budgeting period. First, determine the probable. The probable business conditions, industry sales, and participation may be used to arrive at probable company sales.

Next, the spread of the distribution must be determined. The approach in this area involves making a major assumption. It is that the variability for a particular product in the future will be comparable to its variability in the past. If you grant this assumption, past forecasts can be compared with the actual and the deviation of each forecast from the actual in percent will show the probability distribution of expected sales in the past.

Conceptual Mathematical Approach

Our next problem is to determine the decision levels or how the programs are to be determined in relation to the probability distribution of expected sales. Given a short range forecast in the form of a probability distribution, typical decisions or programs follow:

- Raw material programs and the level of raw material inventories
- Production scheduling programs for labor stabilization and finished goods inventory budgeting

Given the long range forecast in the form of the probability distribution, these are typical decisions to be made and programs to be laid out:

- Appropriation capital requests
- Facilities planning
- Cash forecasts
- Raw material forecasts

Let us now explore the question of how to make a decision relative to the probability distribution. The classic example in this field is known as "The Newsboy Problem." A newsboy sells papers on a particular corner, having costs if papers are left over, and losing sales if he does not have enough papers for his customers. The problem: How many papers should the newsboy buy? But instead of discussing the newsboy's problem, let us do the same thing with a little larger business decision. For this particular example, let us consider the situation in which a seasonal demand in sales exists which exceeds capacity at the time, and we are trying to determine how much inventory should be built up in anticipation of this peak.

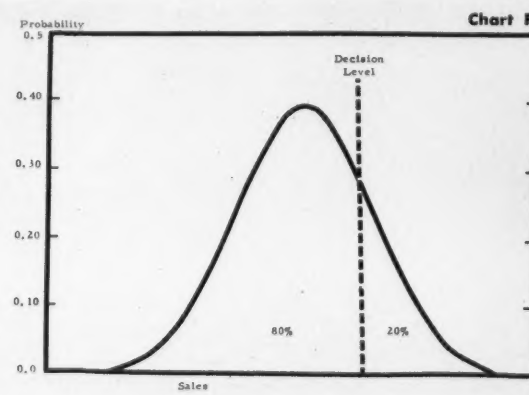
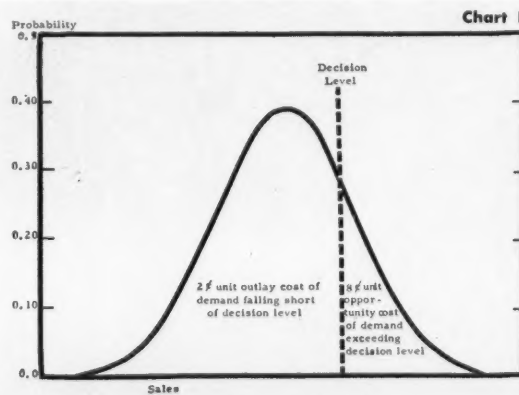
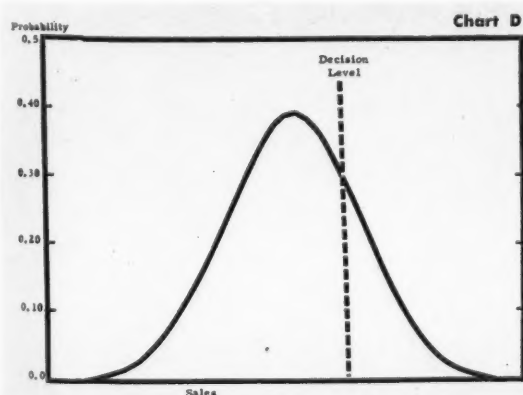
Chart D shows the probability distribution of expected sales for the peak in seasonal business. The vertical decision line shows the amount of product which must be provided to meet expected sales. The bell-shaped curve to the left of the vertical decision line represents demands which are less than the amount needed. If these demands occur, inventory will be left over. The bell-shaped curve to the right of the vertical decision line represents demands which exceed the amount of inventory to be provided. If demands in this area occur, the company will be unable to supply product and the sales will go to competitors.

If demand develops at points to the left of the vertical decision line, the amount of inventory to be provided will exceed actual sales. The company will incur the cost of carrying this inventory until sold. These costs are normally found on accounting statements.

If demand develops on the horizontal axis to the right of the vertical decision line, costs will occur but will not be reported on accounting statements. They

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PROBABILITY DISTRIBUTION OF EXPECTED SALES





BREAKS FOAMING PROBLEM IN STRIPPING TOWERS

Silicone compound ups continuous production of butadiene/styrene latices at Goodyear Chemical

FRANK E. McELROY, Associate Editor
With **RICHARD A. STEENROD**, Materials Engineer
Silicone Products Department
General Electric Co., Detroit, Michigan

Problem: Serious foaming problems in the continuous styrene stripping operation caused severe material losses, incurred heavy cleaning costs, and was a bottleneck in butadiene/styrene latex production at Goodyear Chemical Division in Akron, Ohio. Problem was aggravated because any downtime reduced plant's full production, which had to be kept at capacity to satisfy demand. Plant was the first in the country to produce latex by a continuous process, rather than by batch operation. The styrene stripping operation, where the problem occurred, is a key step in this process.

In making the latices, the butadiene and styrene monomers are emulsified with fatty acid or rosin acid soaps and are catalyzed by an oxidizing agent to copolymerize. Monomer recovery is the next step, in which unreacted styrene is removed by steam stripping.

Presence of excess soap in the copolymerized latex causes foaming, which aggravates this vacuum stripping. This step in the process became a headache, and even though non-silicone defoamers were used, the stripping towers required extremely close control. But even with all this, foam erupted quite often and caused costly shutdown and cleaning.

Solution: Early in 1955, Goodyear switched to using a silicone antifoam emulsion, trade-named AF-60, which is low in viscosity, and readily dispersible. Purchased in drum quantities, it is diluted to a 4% aqueous solution for use. Solution is fed into each column by a gear pump and rotameter setup, at the rate of one gallon per hour

per column. Final concentration in each of the three columns, run in parallel, is but a few ppm. The columns are 45 ft high and 9 ft in diameter. Steam is introduced below the bottom plate, and the fresh copolymer enters from the top. Operating on partial vacuum, the columns strip off unreacted styrene, which is reprocessed and recycled.

Finished latices are used in making foam rubber, backsizing for carpet and textiles, tire cord dips, and adhesives.

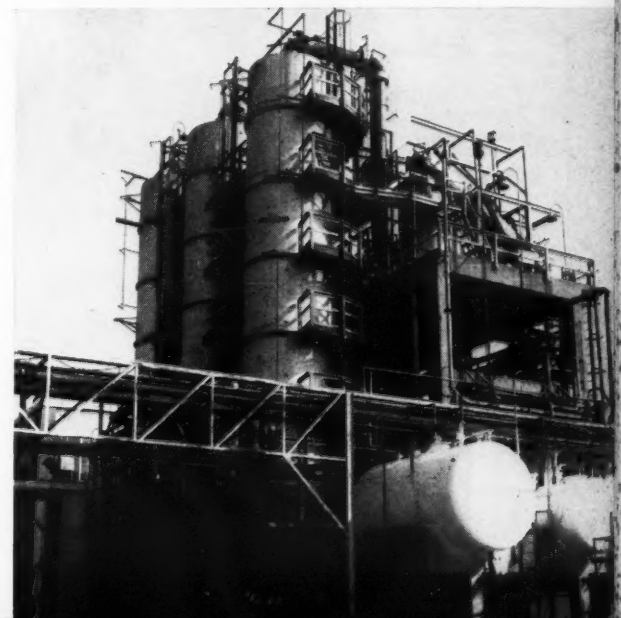
Results: Overall operation has been improved by eliminating the costly foamovers. Stripping rate of some of the latices has been improved.

(AF-60 antifoam is a product of Silicone Products Dept., Chemical & Metallurgical Div., General Electric Co., Dept. CP, Waterford, N.Y. . . . or check 3193 on form opposite last page.)

(Pliolite rubber latices are products of Chemical Div., The Goodyear Tire & Rubber Co., Dept. CP, Akron 16, O. Check 3194 opposite last page.)

◀ A 4% aqueous solution of antifoam is made. Each of these three tanks feeds one column

Antifoam is fed to each of the three stripping towers at left. Costly foamovers have been stopped ▶



After 15 other curing agents were tried in a two-year research program, a liquid polyamide resin was selected that —

MAKES EPOXY COATINGS HARD, YET NOT BRITTLE

GORDON WEYERMULLER, Associate Editor
With A. G. STERNBERG, Technical Director
Steelcote Mfg. Co., St. Louis, Mo.

How to develop a corrosion-resistant coating with outstanding hardness and durability, yet retaining flexibility over long periods — that was the problem that faced Steelcote Mfg. Co. After a two-year research program, a coating that solves many difficult corrosion problems, known as Epo-Lux No. 100, was developed. It is a two-package, air-dry system, combining the advantageous properties of both the epoxies and the polyamides, the latter serving as the curing agent.

During the research program, about 15 different curing agents were tried. Most of these curing agents caused blistering under conditions of high humidity or had other disadvantages. One selected, a liquid polyamide known as Versamid, overcame this problem as well as furnishing a number of other advantages, such as good hiding power and excellent adhesion and chemical resistance.

Polyamide-epoxy resin coating dries dust-free in 45 minutes at 70°F. It is not necessary to bake

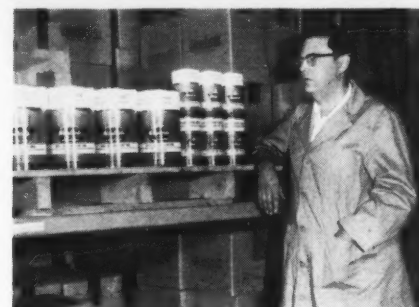
the coating. It is thermosetting, not resolvable in its own solvents, and has excellent resistance to acids and alkalis. One important reason for selection of the polyamide was its non-toxicity to the skin and the fact that it is safe to handle on the part of the customer. The polyamide increases solids of film at point of application, which increases the thickness per coat. It decreases chalking and furnishes better gloss. Coating combines the corrosion-resistant properties of both the epoxies and the polyamides.

Coating is available clear and in a number of colors. A typical formula for a coating in pigmented blue follows:

Base	lb
Epon resin	600
Xylene	300
Methyl isobutyl ketone	300
Titanox	850
Copper phthalocyanine blue	24
	2074
Versamid	1000

Epon resin, solvents, pigments, and other flow controllers are added to a ball mill and the ingredients ground for about 24 hours. Mixture is transferred to change tank, thinned, and tinted. Material is then filled in containers. One part of the polyamide is then weighed in another can to correspond to two parts of the base.

Both the Versamid polyamide and epoxy resins are film formers in their own right. The polyamide, with reactive amino groups spaced along



Twenty-one years experience in the protective coatings field makes Alex G. Sternberg, Technical Director of Steelcote Mfg. Co., well qualified to write the papers and give the technical talks he frequently presents on this subject. Alex attended the University of Chicago and received his B.S. degree in Chemical Engineering from the University of Minnesota. He is a member of NACE and the St. Louis Coating Society. One of Alex's hobbies is building his own houses, being quite proficient at this task.

Photos by CP Staff

After ingredients of base are ground in ball mill, mixture is transferred to change can

After thinning, base material is tinted



molecules, imparts flexibility to cross-linked structures of which they are a part. This overcomes problem of plasticizer migration common to physical plasticizers. Polyamide imparts impact resistance and flexibility to surface coatings to a degree not approached by non-resinous cross-linking agents. Excellent wetting properties of polyamide improve adhesion, facilitate pigment dispersion, and provide uniform flow-out.

Because of the way the polyamide and epoxy react at room temperatures, painter must mix resin



One part of the polyamide is weighed into small can placed on top of larger can, containing two parts of the base

solution just before painting. There are no known cases of dermatitis or other manifestations of toxicity from these resins over several years use.

The polyamide appears to be an inherent corrosion inhibitor. This added to the well-known corrosion resistance of the epoxies gives a coating that will withstand a wide variety of aggressive conditions. For example, in addition to its chemical resistance, Epo-Lux 100 coating has withstood the action of sun and rain for long periods without crazing. Material has been used for coating wet concrete with very good results.

(Epo-Lux No. 100 coating is a product of Steelcote Mfg. Co., Dept. CP, 3418 Gratiot St., St. Louis 3, Mo. . . or for more information check 3195 on form opposite last page.)

(Versamids are manufactured by Chemical Div., General Mills Co., Inc., South Kensington Rd., Kankakee, Ill. Check 3195A opposite last page.)

(Epon resins are product of Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y. . . or check 3195B opposite last page.)

Chemical Materials section
continues on page 34

here's what NATIONAL ANILINE offers

Urethane Producers

Assured Large-Scale Supply of a complete line of diisocyanates from our new multimillion-dollar Moundsville, W. Va. NACCONATES* (diisocyanates) plant. With this major plant on stream, urethane producers can confidently schedule volume production.

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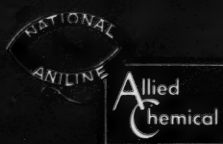
Application Data Sheets on many principal formulations. These Data Sheets contain suggested procedures based on the most recent information developed in our Buffalo Research Laboratories.

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Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia
Portland, Ore. Providence Richmond San Francisco Toronto



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☐ Have representative call by appointment
☐ Send literature only

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ P.O. ZONE _____ STATE _____

TECHNICAL BULLETINS

- () I-17 NACCONATES . . . General Product Information
- () I-17A NACCONATE 80 (Tolylene Diisocyanate Isomeric Mixture)
- () I-17B NACCONATE 65 (Tolylene Diisocyanate Isomeric Mixture)
- () I-17C NACCONATE 100 (2,4 Tolylene Diisocyanate)
- () I-17D NACCONATE 200 (3,3'-Bitolylene 4,4'-Diisocyanate) (TODI)
- () I-17E NACCONATE 300 (Diphenylmethane 4,4'-Diisocyanate) (MDI)
- () I-17F NACCONATE 310 (3,3'-Dimethyldiphenylmethane 4,4'-Diisocyanate) (DMMDI)

APPLICATION DATA SHEETS

- () 41156—Flexible Foams
- () 7956—Semi-rigid Foams
- () 112356—Protective Coatings

D-10

When inquiring check 3196 opposite last page

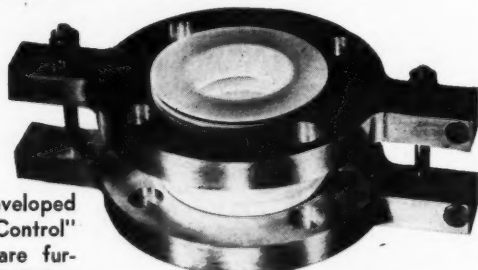
Another first
from Dore' ...
originator of
Quality Controlled
Teflon Shapes

TEFLON BELLOWS DEFLECTION CHARTS

E-8-F
DEFLECTION CHART

SIZE	1"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"
+ 1,000					192	280	345	460	280	364
+ .875					187	258	325	420	140	312
+ .750					174	252	295	392	112	284
+ .625	132	139	165	234	158	231	280	350	96	227
+ .500	102	112	130	199	137	187	251	335	85	194
+ .375	87	99	112	167	122	155	205	280	70	157
+ .250	75	79	98	138	104	140	192	250	50	136
+ .125	55	59	85	101	72	109	140	188	42	87
0	0	0	0	0	0	0	0	0	0	0
- .125	17	35	15	34	16	28	41	58	10	40
- .250	40	55	28	47	30	35	55	80	20	70
- .375	52	70	38	51	34	42	64	85	40	80
- .500	61	80	43	62	45	55	72	91	60	96
- .625	82	93	55	79	56	62	85	105	85	101
- .750			70	87	68	75	125	140	112	131
- .875			252	290	76	85	145	160	120	164
- 1,000			700	820	94	98	181	215	135	182
- 1,145					99	111	195	230	140	192
- 1,250										
- 1,375										
- 1,500										
- 1,625										
- 1,750										
- 1,875										
- 2,000										
- 2,060										

POUNDS FORCE REQUIRED



These Deflection Charts, developed as part of our "Quality Control" molding of Teflon shapes, are furnished with each Style E-8-F Teflon Bellows. They give the force in pounds required for the recommended movement cycle of these bellows. The use of charts will minimize breakage of glass and other fragile type flanges by definitely establishing the length and number of bellows to use for safe expansion and contraction of corrosion-resistant lines.

These charts, giving average values, are the result of months of laboratory checks and tests on all sizes of bellows at all pressures. They are another industry first by Dore', who was

- ... first to provide pressure-temperature charts
- ... first to individually test bellows at pressures 50% greater than recommended operating pressures
- ... first to gauge wall thickness of each bellows convolution.

Deflection charts are available for Dore' Teflon Bellows, Flexible Couplings, and Teflon Lined Expansion Joints. Get optimum safety and performance by specifying Dore' "Quality Control" Teflon Shapes.

John L. Dore, Co.

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FOR JOHN L. DORE, INC.
Du Pont's Teflon • Kellogg's Kelf
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When inquiring check 3197 opposite last page



May 8-11. Fluid Controls Institute, meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

May 9-10. Conference on Managerial Controls, Illinois Institute of Technology Campus, Chicago.

May 12-16. The Electrochemical Society, Inc., meeting, Hotel Statler, New York.

May 13-14. Commercial Chemical Development Association, resort meeting, French Lick, Indiana.

May 13-16. American Petroleum Institute, Division of Refining, semi-annual meeting, Sheraton Hotel, Philadelphia.

May 14-16. Industrial Nuclear Technology Conference, Museum of Science and Industry, Chicago.

May 16-18. Engineering Industries Exposition, Statler Hotel, New York.

May 20-22. Chemical Specialties Manufacturers Association, 43rd midyear meeting, Drake Hotel, Chicago.

May 20-23. American Society of Mechanical Engineers, Second Design Conference and Design Engineering Show, Coliseum, New York.

May 20-24. American Society for Testing Materials, Fifth Conference on Mass Spectrometry, Commodore Hotel, New York.

May 20-24. National Fire Protection Association, annual meeting, Hotel Statler, Los Angeles.

May 27-29. Synthetic Organic Chemical Manufacturers Association, annual outing, Skytop, Pa.

June 2-5. The American Society of Refrigerating Engineers, annual meeting, Hotel Fontainebleau, Miami Beach.

June 3-5. American Management Association, General Management Conference, Hotel Statler, New York.

June 6-8. Manufacturing Chemists' Association, annual meeting, The Greenbrier Hotel, White Sulphur Springs, West Virginia.

June 9-12. American Institute of Chemical Engineers, meeting, Olympic Hotel, Seattle, Washington.

June 11. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

June 11-13. Third Western Plant Maintenance and Engineering Show and Conference, Civic Auditorium, San Francisco.

June 12-14. Illinois Institute of Technology, Operations Research Conference, IIT Campus, Chicago.

June 14. Society of Plastics Engineers, Inc., Regional Technical Conference, "Plastics for Electronics," Lowell Institute of Technology, Lowell, Mass.

June 16-21. American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

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Chemical Feed Lines (laboratory, catalyst, pilot plant reusable),
Hot Corrosive Liquids or Steam
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*"Teflon"—DuPont trade name
for Tetrafluoroethylene resin

When inquiring check 3198
opposite last page

CHEMICAL PROCESSING

Phillips High-density Poly Plant On Stream page 28

Increasing Competition Among Fiber Makers page 30

Sun's "Custom Blended" System In The Works page 30

chemical business

Trends in the chemical world . . . what they mean to you
as reported by the editors of CHEMICAL PROCESSING

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Chemical Imports, Exports—

CMRA Sees Growing Impact of Foreign Business . . . page 25

MAY 1957

*For new and better monomeric and polymeric
esters in the rubber, plastics, plasticizer,
synthetic lubricant and chemical industries*

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basic source of
higher-quality

ADIPIC ACID



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Highlights

Chemical Market Research Assn. discusses import, export business; warns chemical makers of pitfalls of faulty foreign market research page 25

Lithium Institute launches research program to secure basic information on lithium's ability to form alloys with other metals page 25

Chemical sales resulting from Government's road-building program calculated, found to offer markets equal to one percent of total 1956 sales page 27

Phillips' rigid polyethylene operation goes on stream, will reach slated capacity of 75 million pounds annually before 1958 page 28

Sun Oil's "custom blended" fuel system to be in operation early in 1958, offers motorists wide range of octane ratings page 30

When inquiring check 3199 opposite last page

Lithium Institute Sponsors Research At MIT

First announced programs of the newly formed American Lithium Institute are sponsorship of two research programs and the establishment of two fellowships.

Research on lithium alloys has been initiated at Massachusetts Institute of Technology, and a program of research on lithium-containing glass is underway at Pennsylvania State University. Fellowships have been established at the two institutions.

The Institute was formed for two primary purposes, according to **Marshall Sittig**, its president and managing director: to broaden present markets for lithium and to establish new ones. Its most important functions, he said, are to sponsor research programs and to acquaint industry with lithium's potentials.

"Lending impetus to the research at MIT," Sittig explained, "is the dearth of basic information on lithium's ability to form alloys with other metals. Although there are some 85 metals, binary phase diagrams for only 15 metal-lithium alloy systems are in the literature. And the Institute is looking to lithium to solve a number of problems in the nuclear and missile fields, among others."

Three member companies sponsor the Institute: American Potash, Foote Mineral, and Lithium Corporation of America.

What of lithium today? The Institute has published a booklet, covering the properties of the metal and recapping some of its current uses. Describing such applications as a gel for greases and a deoxidizer in copper refining, the piece points out areas where lithium might function in existing processes.

For a copy of "Presenting Lithium", write the American Lithium Institute, 8484 Nassau Street, Princeton, N. J. . . . or for more information reader may simply check 3199A on the form opposite last page.

Overseas Market Research Tricky, But Imperative To Expanding Foreign Operations, Says CMRA

"The approach to a market study abroad is no different from studying a domestic market — except for the task of interpreting out-dated, incomplete, inaccurate, and misleading information, and the need to exercise five times as much ingenuity," says Grace's Polymer Chemicals v-p, **Elwyn E. Winne**. "In many foreign countries, official statistics are often non-existent, while in others you will find your product hidden away in a classification which includes 2000 other products."

Speaking at a recent Chemical Market Research Association meeting, Winne concluded that while serious pitfalls await the market researcher looking into

foreign markets, an intelligent job can be done and, indeed, must be done if US chemical companies are to exploit the expanding foreign markets.

Theme of the Philadelphia meeting: The next five years of competition with the foreign chemical industry. Conclusion: US companies will penetrate foreign markets to an even more appreciable degree over the next few years but will not do so without expanding their techniques of market researching.

Imports, too, fell under the scrutiny of the group. DuPont's **Dr. Miles Dahlen** pointed out that from an average of \$80 million annually for the five years preceding World War II, chemical imports reached a 50 percent higher average annual level at \$119 million during the five-year period immediately following the War. Disregarding the effect of the Korean emergency, US chemical imports rose steadily to reach a 1955 level of \$255 million — well over 100 percent above the post-war base.

What accounts for the increasing chemical import volume? "The first factor," says Dahlen, "is the enormous US appetite for raw material. A large part of our imports consists of basic products whose low cost is an important consideration to domestic manufacturing. Second is the important technological strides the foreign chemical industries have made in recent years.

"Third factor consists of the foreign industries' adaptability in making the specialized products which are needed in some nook or cranny of American

(Please turn to next page)

Grace Opens Polymer Lab, Plans To Stress Customer Service

With an eye toward helping customers with their merchandising problems as well as normal technical research, Grace's Polymer Division has opened new sales service labs at Clifton, N. J.

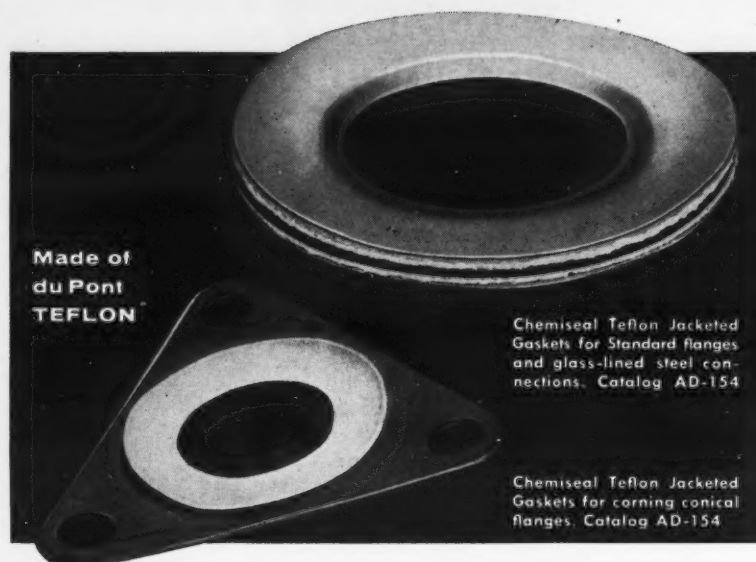
While some plans are still in the talking stage, the gist of Grace's selling plans for its new line of high-density polyethylene is this: Help the plastics



Polyethylene sample is tested at Grace's Polymer Division labs at Clifton, N. J.

converter or molder with his own sales problems, even to the point of market research and (proposed) cooperative advertising.

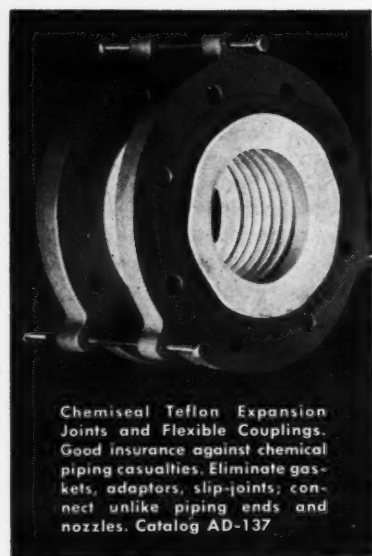
With about 16 other companies competing in the "polyethylene derby", Grace feels that an added amount of marketing effort must be put into the sales program to gain the proportion of the market it wants.



Chemiseal Gaskets

AND ACCESSORIES FOR CHEMICAL PIPING

IMPERVIOUS TO — **ACIDS**
— **CAUSTICS**
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United States Gasket *Plastics Division*
OF THE GARLOCK PACKING COMPANY

When inquiring check 3199B opposite last page

(Continued from preceding page)

industry. A significant percentage of US imports of finished chemicals falls into this category.

"The last major factor is the sheer size and activity of the American industry itself. This insatiable appetite to chew up chemical raw materials will always offer some opportunity for foreign chemicals to participate in the US market."

Dow's **Dr. Lewis E. Lloyd** explained that a prime cause for the increased competition from foreign chemical makers is their attempt to reclaim markets held prior to World War II. The first phase of American business competition against foreign exporters comes in these third-country markets of the world.

Yet the importance of obtaining dollars has induced foreign exporters to seek sales in this country even before reclaiming some of their former world markets. As a consequence, some segments of our chemical industry are already hard-pressed by the amount of imports. In these fields foreign competitors will make further inroads; and if tariffs and other trade conditions remain the same, it will drive American producers out of some parts of the US market completely.

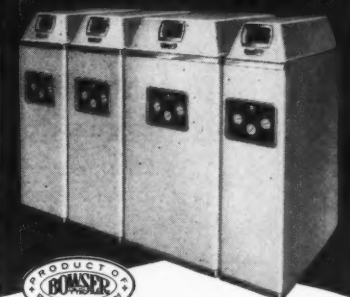
A guide to sources of information on foreign markets has been made available by the organization. For a copy write to Chemical Business, 111 East Delaware Place, Chicago 11, Ill. . . or check 3199C on form opposite last pg.

3M Buys KEL-F Business from M. W. Kellogg

M. W. Kellogg's fluocarbon business has been sold to Minnesota Mining & Manufacturing Co., along with the manufacturing facilities in Jersey City, N. J. A 3M spokesman explained that the company's chief interest in making the purchase was to develop additional uses for the KEL-F resins, particularly within the chemical field and for pharmaceutical packaging.

Kellogg, an engineering and construction firm, originally became interested in the polymer field as a result of an engineering assignment at Oak Ridge during World War II.

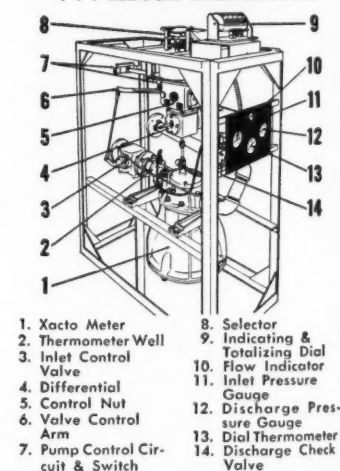
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3. Inlet Control Valve
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12. Discharge Pressure Gauge
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When inquiring check 3200 opposite last page

CHEMICAL PROCESSING

Computer Calculates Impact of Road Building Program on Chemical Industry

The best look yet at the chemical markets resulting from the Government's \$50-billion road building program (and an additional \$50-billion in privately financed roads) shows that money spent on chemicals and allied products (SIC Group 28) will equal almost one percent of the total 1956 output.

The highest indication within the group is synthetic rubber with 2.9 percent, followed by paints with 1.6 percent.

Compiled by the Council for Economic and Industry Research, Arlington, Va., the study (performed on an IBM 704 system) required something like 36,500 multiplications and 110,000 additions — and took about 40 seconds on the computer.

The study indicated that in the 13 years covered by the program about 880,000 jobs would be created across the entire 190 industries considered.

Some other findings: Cement output will be affected to the extent of 28 percent of the 1956 level; steel, 3.2 percent, and tires and tubes, also 3.2 percent.

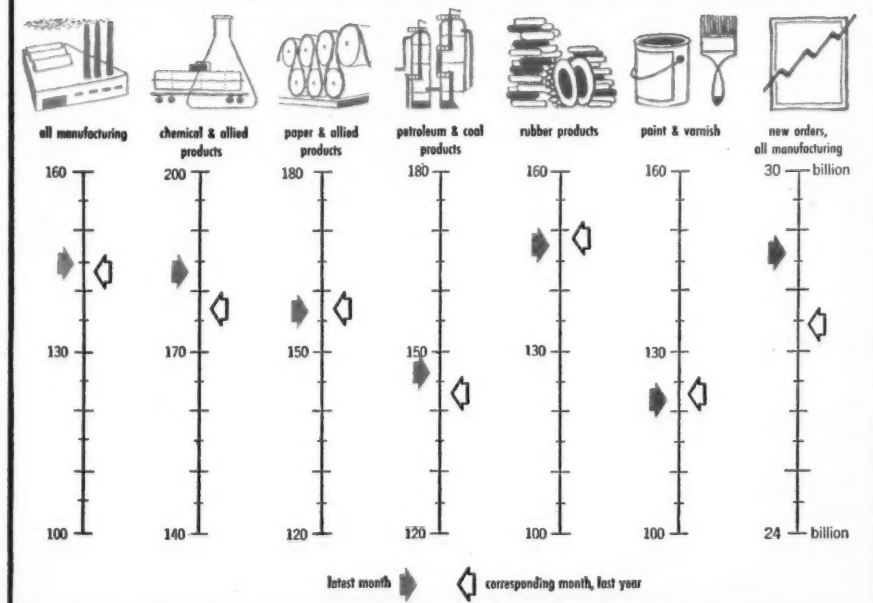
There's A Trick To Continuous Synthetic Latex Production

Goodyear Tire's Chemical Division in Akron was the first company to produce synthetic rubber latex by a continuous process. To do it, they had to anesthetize a plague of "bugs," one of which was foamover in the styrene stripping operation. Stripping removed unreacted styrene from the butadiene-styrene emulsion which eventually ends up as Goodyear Pliolite Latexes.

How they found an economical solution to the foamover problem is told in the feature story which you'll find on page 18.

chemical business INDEX

Production indices, from latest available Federal Reserve Board figures, based on 1947-49=100. New Orders, All Manufacturing, (last column) from latest available Department of Commerce data.



CANDLES
WAXES
LUBRICATING
GREASES
BUFFING
COMPOUNDS
TEXTILE
FINISHES
MONO-GLYCEROL
ESTERS
DI-GLYCEROL
ESTERS
HOT MELT
ADHESIVES
JAPAN WAX
REPLACEMENTS

HYDROFOL GLYCERIDES T-57-N

STABLE AGAINST...

HEAT

DECOMPOSITION

DISCOLORATION

T-57-N is the highest quality hydrogenated tallow made to stubbornly resist heat, oxidation, and discoloration, the three bogies that work against your efforts to make more marketable products. This indeed, is the superior glyceride that puts quality second to none into your products, as well as a surprising durability, to assure repeat orders. Samples and additional information are available; write on your company letterhead.

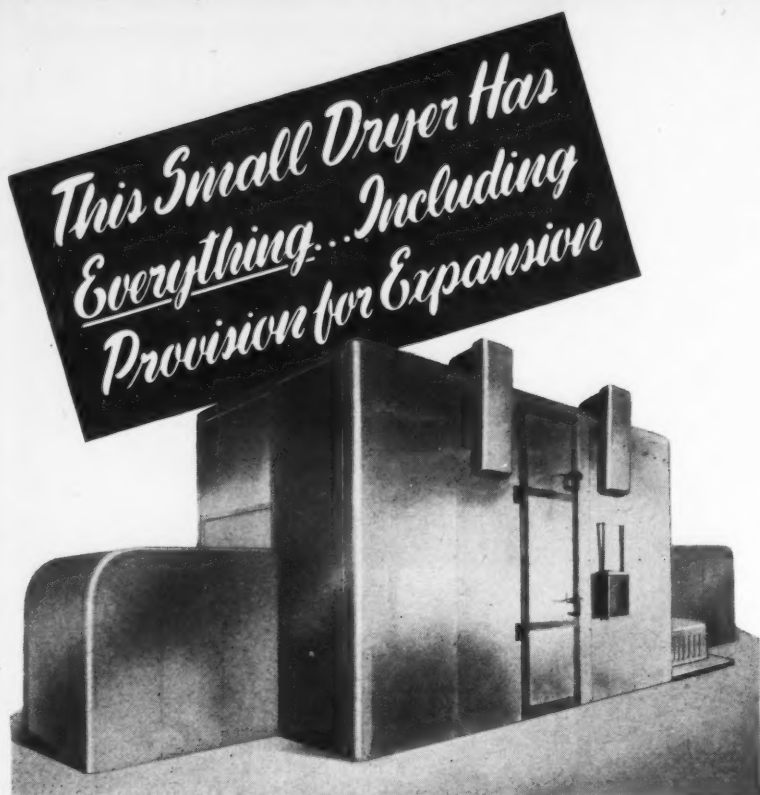
AVERAGE SPECIFICATIONS	
FFA Max. As Oleic	0.5
Acid Number (Max.)	1.0
Saponification Value	193-198
Iodine Value (Max.)	1.0
Titre °C.	57-61
Melting Pt. °C.	59-64
Specific Gravity @ 100/20°C.	0.8450
Color Max. (5/4" Lovibond)	10Y/1R



Hydrogenated and Distilled Fatty Acids and Stearic Acid. ... Hydrogenated Vegetable, Fish, Sperm Oil and Tallow ... Hydrogenated Castor Oil ... Stearyl, Cetyl, Oleyl Alcohol ... Sperm Oils and Spermaceti ... Behenic Acid ... Erucic Acid ... Hydroxystearic Acid ... Olefins ... Hydrocarbons.

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CHEMICAL PRODUCTS DIVISION
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"NATIONAL" APRON CONVEYOR DRYER

While this comparatively small Apron Conveyor Dryer was installed to immediately provide pilot plant production, it is readily adaptable to expansion to meet future large-scale production requirements. It incorporates all the features available in the largest "National" Dryers of this type, including the following:

The most efficient air control devices, to assure absolute uniformity of air distribution and condition through the material.

Wide flexibility in air delivery by use of adjustable pitch fans.

Adjustable sealing of air to eliminate leakage and dust carry-over to chain and other parts of equipment.

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When inquiring check 3201 opposite last page

**chemical
business**

Our Growing Industry

Phillips Chemical Begins Shipment of High-density Polyethylene

Phillips Chemical's new rigid polyethylene operation, slated to reach capacity of 75 million pounds annually before 1958, has gone on stream at Houston. Feed stock comes from Phillips Petroleum's Sweeney Refinery, gets to Houston operation by 75-mile pipeline. Ethylene is being stored in underground caverns washed from deep salt formations near the refinery.

To date, Phillips has licensed the catalytic process to four major US producers and seven foreign chemical companies in as many countries. Most recent foreign licenses are Industrias Quimicas Electro Cloro, S. A., Brazilian subsidiary of Solvay & Cie, and Showa Denko K. K., of Japan.

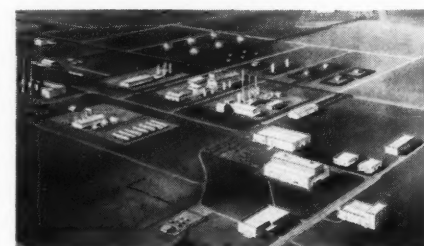
To aid potential users of the rigid poly as well as other Phillips plastics, the company has set up a sales service lab near Bartlesville, Okla.

by Air Reduction. Other facilities are at Butler, Pa., Riverton, N. J. and Chicago.

Callery Chemical To Run \$38 Million High Energy Fuel Plant For Navy

Initial construction has begun on a \$38 million high energy fuel plant at Muskogee, Okla., to be operated for the Navy by Callery Chemical. The project is expected to be completed early in 1959.

The operation will produce greatly increased quantities of a new fuel, developed from high energy boron com-



Artist's drawing of Callery's high energy fuel plant under construction at Muskogee, Oklahoma

Di-isobutylene from Texaco

New Port Arthur, Tex., plant for production of di-isobutylene has been completed by the Texas Company and was expected to be on-stream by press time. Plant will have initial capacity of eight million pounds annually but can be expanded as requirements increase.

Plant is located at the Texaco refinery in Port Arthur, largest of the company's 11 US refineries.

Other Texas Company petrochemical projects include construction of a lube oil additive plant at Port Arthur and an ammonia operation at Lockport, Ill.

Air liquefaction facilities

... \$7.5 million worth, are under construction by Air Reduction at Bassett, Calif. To produce daily 55 tons of liquid oxygen, 15 tons of liquid nitrogen, and 3.5 tons of liquid argon, the plant is scheduled for completion late this year.

Operation will be the fourth air separation and liquefaction plant operated

pounds, for further evaluation and testing by the Navy. The plant, first of its kind, will be capable of expanding into a full scale production unit.

Start of the operation climaxes eight years of work in this field by Callery. Based on the company's earlier research, the Navy awarded Callery a contract in 1952 to develop fuels for jet aircraft and missile applications.

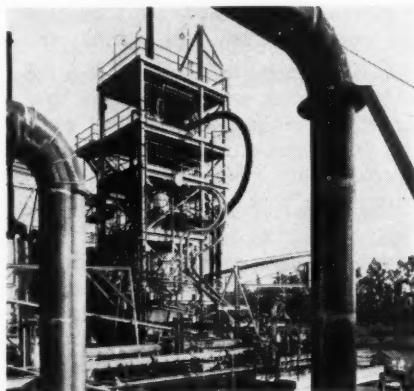
Phthalic anhydride capacity

... is increased by 60 percent at Monsanto's Everett, Mass., plant as a result of recently completed expansion. A major product of the Everett operation, the material is also produced by Monsanto at its John F. Queeny plant at St. Louis.

Monsanto's sales of phthalic anhydride last year increased 30 percent over the 1955 level.

DuPont's TEL Plant On Stream

Third tetraethyl lead operation for DuPont, this one at Antioch, Calif., has gone into production. Employing a continuous process, the plant will ship



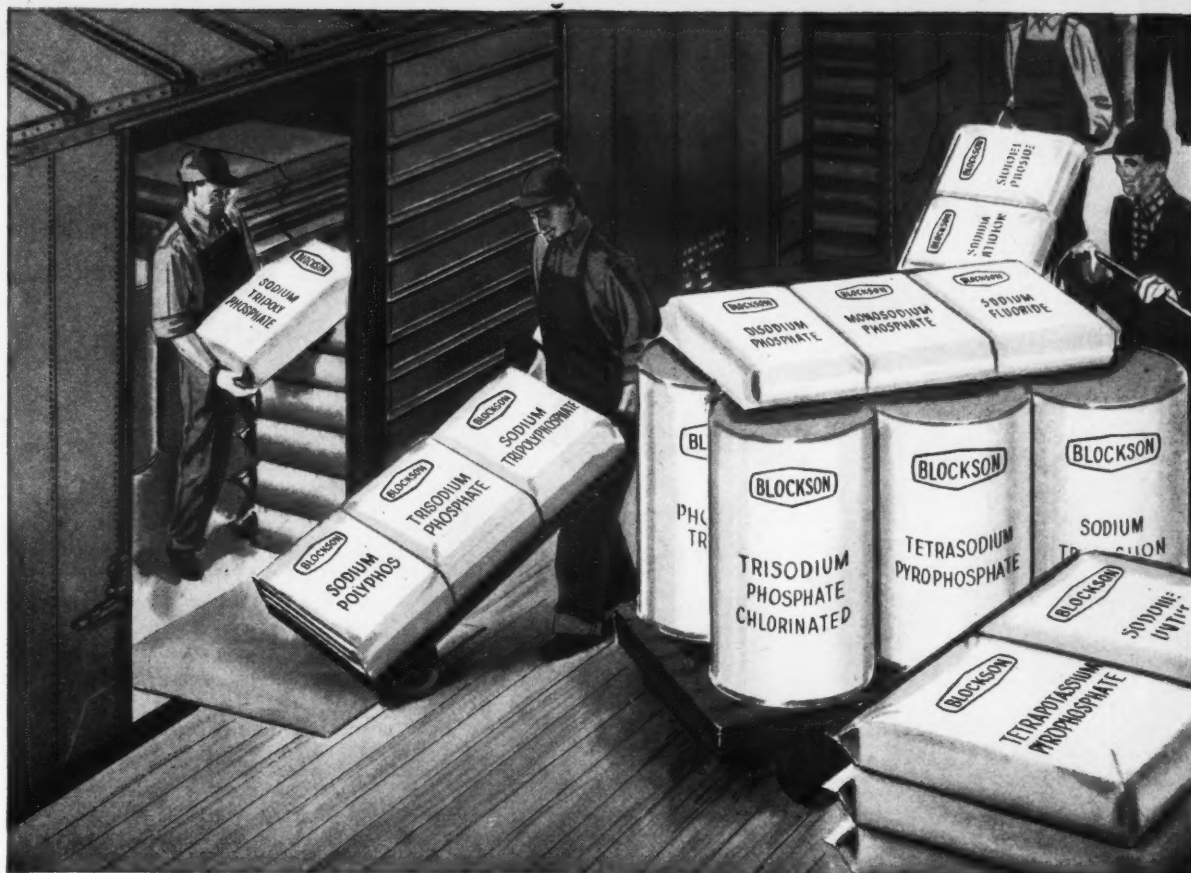
Reactor tower at DuPont's new TEL operation

TEL to refiners west of the Rockies. Other DuPont TEL plants are at Deepwater Point, N. J., and Beaumont, Tex.

After two years

... of pilot-plant scale production, Monsanto has started construction of facilities to produce dichloroisocyanuric and trichloroisocyanuric acids in tonnage quantities. Located at Everett, Mass., the multi-million-pound-a-year plant will be the first of its kind in the country. Plant is expected to be completed and in operation this fall.

Major uses for the two materials are as active ingredients for dry household bleaches, commercial laundry bleaches, and industrial sanitizing agents.

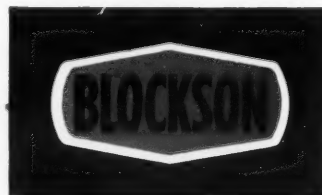


Why more and more buyers now order Blockson Phosphates in mixed car and truckloads

Mixed car phosphate purchases simplify their scheduling and traffic control. One collect phone call to Blockson instantly expedites unforeseen needs. Also, each Blockson chemical in the mixed car or truck receives the carload price... Blockson customers usually carry less inventory. That's because Blockson varies the flow of phosphates to the buyer's changing requirements—regardless of changing conditions. Blockson can do that because Blockson maintains the extra stand-by capacity—backed by a continuous expansion program. Call Blockson or your Blockson distributor soon.

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chemical
business

Marketing Trends

Fiber Makers Square Off Against Wool and Each Other In Markets Competition

Among other battles for markets shaping up in the synthetics field, one of the most lively promises to occur in synthetic fibers, notably the acrylics. And the contest may well be complicated by the fact that wool prices have recently halted their upward trend and wool is again standing up very well under the competitive blows of the synthetics.

Major contenders are Chemstrand's Acrilan, Cyanamid's Creslan, Darlan, produced by Goodrich Chemical, Union Carbide's Dynel, DuPont's Orlon, Verel, a product of Tennessee Eastman, and Dow's Zefran. Not all of the materials are on the market in full commercial quantities now but should be available in tonnage quantities within a couple of years. Orlon and Acrilan, of course, have been sold for about five years, and Dynel has been available for some time.

Forecasts place annual synthetic fiber production at four billion pounds by 1975, with the acrylics accounting for about one billion of the total.

Views aired at the recent meeting of the Textile Research Institute indicated that the most important talking points

like 30 to 35 percent of the country's commercial vehicles were equipped with nylon, and about 25 percent of all replacement tires sold for passenger cars were reinforced with nylon.

Price has ceased to be much of a factor in sales of nylon-equipped tires. Major tire makers are selling nylon cord passenger car tires at prices only approximately five percent above comparable tires with rayon construction.

Nylon first saw use in tires during World War II. Consumption by tire manufacturers in 1951 was in the neighborhood of 4 million pounds, jumped to 64 million pounds in 1956.



DuPont technicians dissect test tires constructed with nylon cord

among the synthetic markets will be improved dyeability, color fastness and resistance to shrinking — as well as price.

According to Chemstrand's **Walter H. Hindle**, the rising costs of wool have been of prime importance in the growing acceptance of the synthetics.

In other marketing areas, too, synthetics are gaining ground. In 1956, all of the nation's airlines were using 100 percent nylon cord tires. Something

Sun Plans "Custom Blended" Fuel For Early 1958

Designed to give the motorist the exact octane rating needed for his car, Sun Oil's new "custom blend" gasoline pumping system will be installed throughout its 21-state marketing area sometime early in 1958. The system is the Company's first departure from its single-grade system in 30 years.

Says **Frank R. Markley**, Sun's marketing v-p, "For the first time the motorist will be able to get tailored motor fuel with the exact octane needed for his car's engine... without wasting money for octane the engine can't use."

The new system blends fuels in a wide range of grades, each priced accord-

CHEMICAL PROCESSING

ing to quality, right at the service station pump. This is what happens: The pump draws from two separate underground storage tanks in exact ratios selected by a dial setting, automatically computes a single proportioned price based on the selected ratio, and feeds the two streams separately through a hose-within-a-hose to the nozzle where the streams are blended.

Previous to development of the system, trends indicated a need to provide the motorist with a wide range of fuel qualities to match the range of engine compression ratios. After the system was perfected, Sun undertook to get the answer to one remaining question — how would the motorist react? Market research teams invaded Florida, assembled data on the buying habits of over 100,000 motorists at Sunoco and competitive stations, and interviewed more than 30,000 buyers at Sunoco stations and in their homes.

Sights and Delights, Industry in Arizona

Arizona's potential and possibilities as a new industrial frontier — together with a brief of major tax law provisions affecting business and industry — are given in "Arizona Industrial Facts." Issued by Arizona Development Board, the brochure is first publication covering aspects of Arizona of particular interest to industry.

Why are companies moving to Arizona? Many reasons are given — some are the status of Arizona as a vacation state, ease of attracting highly trained personnel as engineers, contentment of personnel and labor, and first — and last — the twelve-month vacation climate which allows year-round outdoor working conditions.

Included in the brochure is a field and laboratory report on diatomaceous earth deposits readily accessible. Also included is an "Arizona Cotton" folder on irrigated cotton produced in the state.

For a fast check on what Arizona might offer to you and to your organization, write Arizona Development Board, 1521 West Jefferson St., Phoenix, Arizona, or check 3201C on Reader Service Slip opposite last page.



This underwater photo dramatically illustrates speedy dispersibility of new Dow Corning Antifoam B.

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ANTIFOAM B

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New Dow Corning ANTIFOAM B disperses immediately in aqueous solutions. No stirring or agitation required.

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Just add "as is." No delays for diluting or mixing. No need for extra containers.

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Solve Your Drying Problems

in the WYSSMONT DRYING LABORATORY

As drying engineers we constantly strive to improve not only our design but also our methods of testing to eliminate guessing. After years of development, we have come up with the last word in laboratory test drying facilities. That is why increasing numbers of manufacturers are calling on the facilities and "know-how" of the Wyssmont drying laboratory to help solve drying problems in connection with products that may be fragile, heat sensitive, oxidizable, toxic, hazardous or otherwise difficult to process.

Here in our Wyssmont Test Dryer, simulated actual operating conditions such as material temperature, drying temperature, drying rates, air velocities, turnover cycles are established. These tests are further fortified with complete moisture, chemical and physical determinations. The recording and data are translated into graphs, such as those shown here.

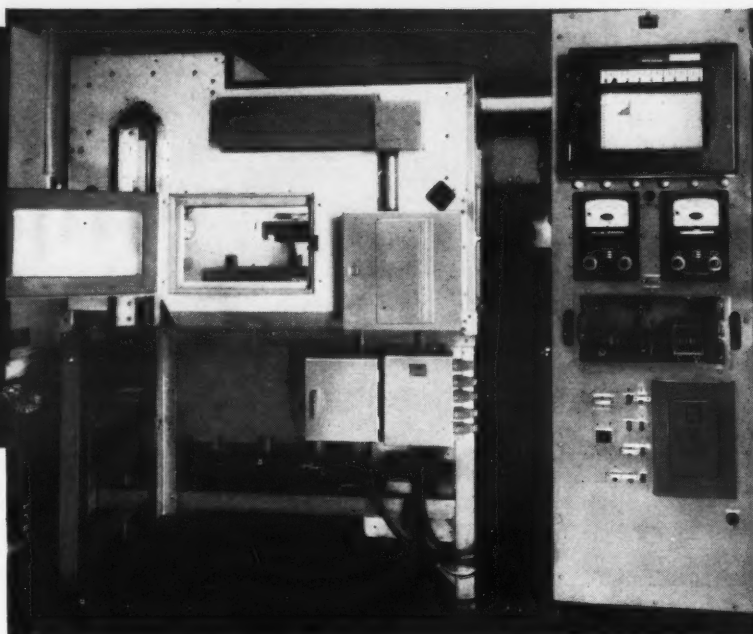
Whether the problem involves drying only, solvent removal and recovery, purification by sublimation or gas-solids reactions, the tests are exhaustive, the product analysis complete and accurate, the report and the conclusions objective and unbiased.

WYSSMONT COMPANY, INC.

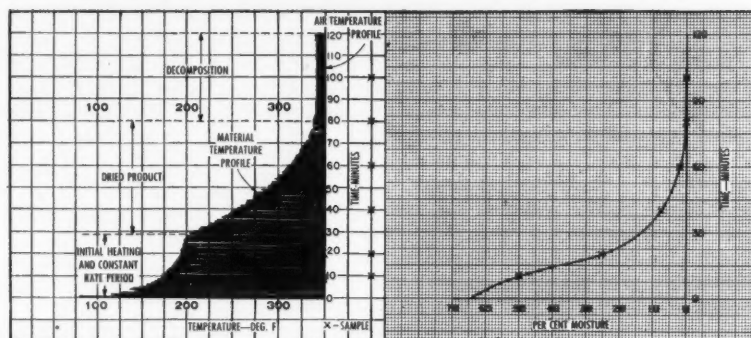


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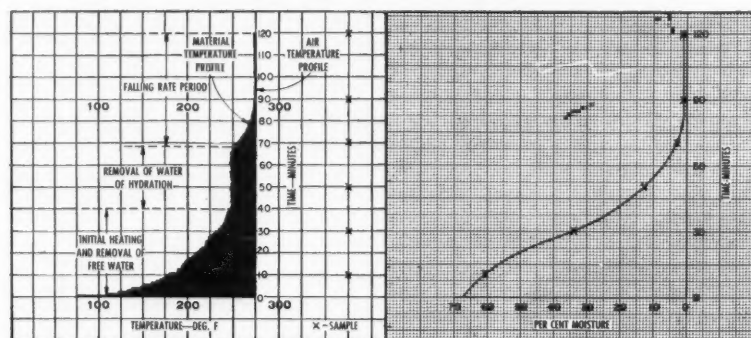
DRYING • SUBLIMATION • OXIDATION • COOLING
Home Office: 42-07A 27th Street (Bridge Plaza South) Long Island City 1, New York • Representatives in principal cities



Wyssmont automatic transfer type test dryer with control panel.



Typical record of drying product which sublimes or decomposes.



Typical record of drying a hydrate.

A Chemical Library in One Volume

"The Encyclopedia of Chemistry," just released by Reinhold Publishing Company, New York, contains in its 1037 pages not only major compounds and classes of chemicals, but such subjects as atomic power, air pollution, safety, packaging, and a number of biographies chemical greats.

In total, more than 850 topics written by over 500 authorities are included.

Among the topics: major chemical classes and compounds, biographies, technical societies, and other related topics such as atomic power, plastics, air pollution, safety, packaging.

De Nora sees cell market

... for chlorine electrolysis to recover chlorine from waste hydrogen chloride from organic reactions. This small electrolysis cell makes a compact recovery system, boasts good flexibility to meet varying process demands. One point in favor of using such equipment: Recovered chlorine is only one credit for the process — equal cost savings (and sometimes overwhelming nuisance savings) result from not having to neutralize or dispose of the acid waste.



First tank car shipment

... of hydrazine recently left Olin Mathieson's Lake Charles, La., plant for an undisclosed destination. Previously shipped only in smaller quantities, the material is generally thought of as fuel for rockets but is finding increasing industrial use.

Spotlight on people

Dr. Francis M. Parker is named to the newly created position of marketing director for American Viscose. Dr. Parker will head market research activities for the entire company but will concentrate on new products stemming from the recently expanded research and development division.

Winfield I. McNeill is elected vice president of newly organized firm of Calkin & Bayley, Inc., industrial consultants.



Mooradian

Harry S. Mooradian becomes vice president in charge of manufacturing for Dayton Rubber.

Escambia Chemical appoints **A. N. Wohlwend** vice president. He retains his duties of director of commercial development. **Erhart K. Drechsel** joins Escambia and will devote full time to commercial development activities.

Fred K. Shankweiler is made director of sales for cellulose products department of Hercules. New sales manager of cellulose and chemicals division of Hercules' Virginia cellulose department is **A. R. Olsen**.

Dr. Robert W. Cairns, company's director of research, is appointed chairman of the advisory panel on general sciences for the office of the Assistant Secretary of Defense.

William C. Foster, Olin Mathieson executive v-p in charge of company's high energy fuels activities, has received an Honorary Doctor of Laws degree from Syracuse University.

Harold J. Rose is promoted to assistant general manager of Esso Standard Oil's chemical products department. And at Esso Research and Engineering Company, **Dr. William J. Sparks**, co-inventor of butyl synthetic rubber, is appointed to new post of scientific advisor.



Rose

New sales divisions and their heads at Catalin . . . **Edward W. Bastian**, sales vice president, thermosetting division; **Frank E. Hadley**, vice president, thermoplastic division; **Paul A. Krentel**, chemical division; **Viv Moss**, sales manager of special accounts, thermosetting division; and **Jack Weiss**, vice president, sales manager of special accounts for the thermoplastic division.

Donald H. Thomas is appointed assistant director of industrial development at First National Bank of Saint Paul.



Garthwaite

Albert A. Garthwaite Jr. is new president of Lee Rubber & Tire.

Officers of recently formed Sylvania-Corning Nuclear Corporation are **W. Benton Harrison**, chairman of the board; **Dr. Lee L. Davenport**, president and treasurer; **Walter E. Kingston**, executive vice president; **Garth W. Edwards**, controller; and **Howard M. Cohen**, secretary.

Elliot W. Atkinson, vice president and treasurer of Lion Oil, division of Monsanto, is appointed assistant to president, handling special projects.

DuPont appoints **W. Samuel Carpenter III** to director of sales for petroleum chemicals division, succeeding **David H. Conklin**. Conklin becomes managing director of DuPont (United Kingdom) Ltd.

NEVER UNDERESTIMATE THE DANGER OF FLAMMABLES!



a FUMBLER WRENCH . . . or

a stray welding spark—a scuffed heel—the stroke of a paint scraper—these are only a few of many common workday incidents which have touched off disastrous fires in the presence of flammable vapors!

Never underestimate the danger of flammables!

Ignitable vapors from open containers are constantly escaping into the air. Even a small quantity of flammable liquid must be regarded as a potential fire hazard, and must be rendered harmless by using a container designed on established fire-preventive principles. Then, these helpful liquids can be used with perfect safety to plant and workers.

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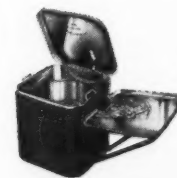
The Protectoseal Company maintains a national field organization of Safety Engineers whose broad experience qualifies them to detect flammable liquid hazards in all phases of plant operation, and make recommendations to eliminate these hazards in a practical, workable manner. A highly specialized engineering staff is also available to develop fire preventive flammable equipment to meet individual special requirements.

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Check the coupon for the free flammable liquid safety guides you require for protected plant operation. When received, if you do not find the fire preventive equipment adaptable to your plant operations, write direct to our Technical Services Department for their help.

Working to prevent fires in cooperation with Underwriters' Laboratories, Inc., Associated Factory Mutual Fire Insurance Companies, National Fire Protection Association, Factory Insurance Association, Improved Risk Mutuals.

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FIRE PREVENTIVE WASH TANK with Drain Board for cleaning small parts is one of many specially designed units for safeguarding production operations. More than 20 different types and sizes available for various cleaning and washing operations.



FOOT TREADLE OPERATED DIP TANK for cleaning larger parts is waist high and has self-closing cover which automatically prevents or instantly extinguishes flame. Types for production lines and maintenance departments.

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Please send the following flammable safety guides with Price Lists, and the Safety Bulletin series as checked below:

☐ Safety Can Catalog ☐ Drum Storage and Dispensing Catalog ☐ Vent and Fitting Storage Tank Catalog ☐ Safety Bulletin Series on "Flammable Liquids, their characteristics, hazards and safe handling"

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COPPER

COPPER SULFATE

Industrial Crystals and all common grades.

MONOHYDRATED COPPER SULFATE

35% Copper as metallic packaged in steel drums at no extra cost.

COPPER CARBONATE

55% Copper as metallic. Light and dense grades.

CUPRIC CHLORIDE

37% Copper as metallic. Available in poly-lined drums or bags.

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Minimum 76% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.

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36% Zinc as metallic. White, free flowing powder.

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Partially hydrated, free flowing granular form. Available in bags or bulk.

Samples, specifications and detailed information upon request.

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Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.

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Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.

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T-C HYDRO is a dry, white, free flowing, crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.

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65% Mn SO₄. Designed specifically for inclusion in mixed fertilizer.

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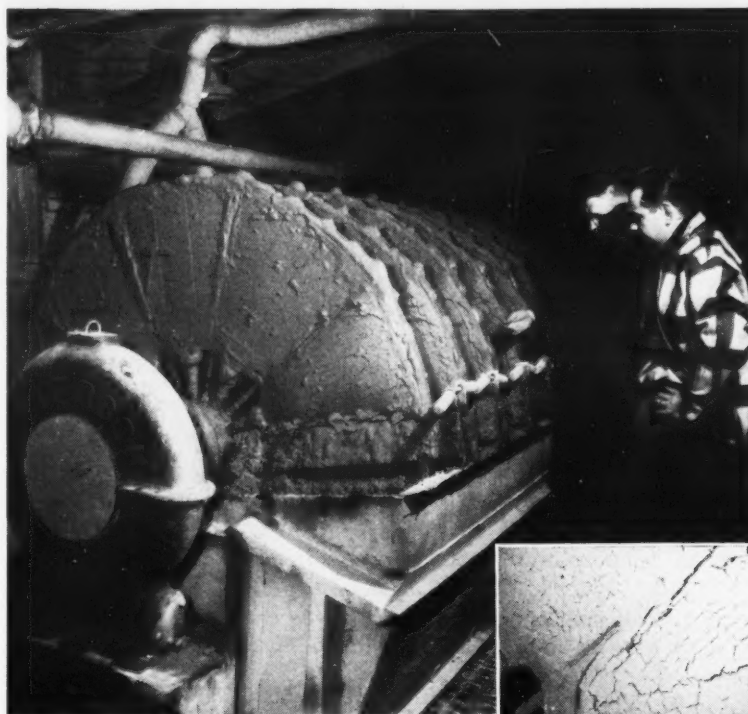
93% Mn SO₄ · H₂O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

MANGANOUS OXIDE

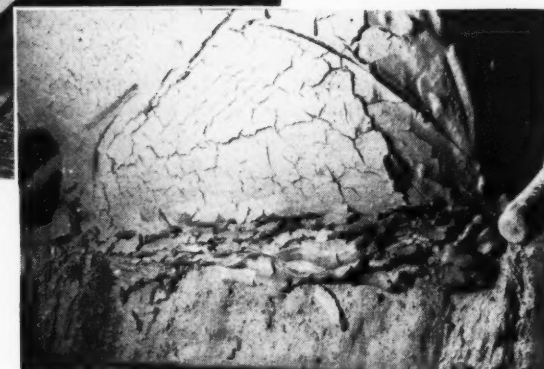
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

chemical materials

Continued from page 21



Climax Uranium, Grand Junction, Colorado, uses this synthetic flocculating agent in the thickening tank from which solids are cycled to their disc filters. This filter separates water from uranium-bearing solids . . . note the thick cake coming off the filter as it rotates, as shown in the closeup



Gives cleaner, speedier separation of solids from uranium liquors

Uranium mill management is becoming more conscious of competition as more mills enter the field and AEC drops the price they're paying for uranium concentrate.

Process improvement is their answer to the profit squeeze. They've found an efficient flocculating agent to ease a bottleneck in separating pregnant uranium liquors from solids and ore tailings, and in separating uranium-rich solids. In fact, their idea can also be used in refining other types of ores.

Problem: A bristling problem that's been taunting uranium mill superintendents and metallurgists has been filtering and separating pregnant liquors from solids and ore tailings, and also the settling of uranium-bearing solids before leaching.

Mills operating on the Colorado Plateau use ores averaging 0.23% uranium. The first step in concentration is putting the uranium into solution. This is called "pregnant liquor." They use a number of processes: salt roast carbonate leach, carbonate leach, acid cure, and acid leach. (They then recover uranium from this solution by column ion

TENNESSEE **TC** **CORPORATION**
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617-629 Grant Building, Atlanta, Ga.



In another Colorado mill, operator adjusts flocculant solution's rate of flow into a thickener and into a series of filters from which cake is discharged to roasters. Multiple-stage addition of dilute solutions is key to optimum effectiveness of the agent

exchange, solvent extraction, resin in pulp, and other means.)

After getting the uranium into solution, all solids and ore tailings must be taken out. Much work and experimentation has gone into finding efficient flocculants and filter aids to do this. Natural gums and starches and inorganic flocculants have been tried.

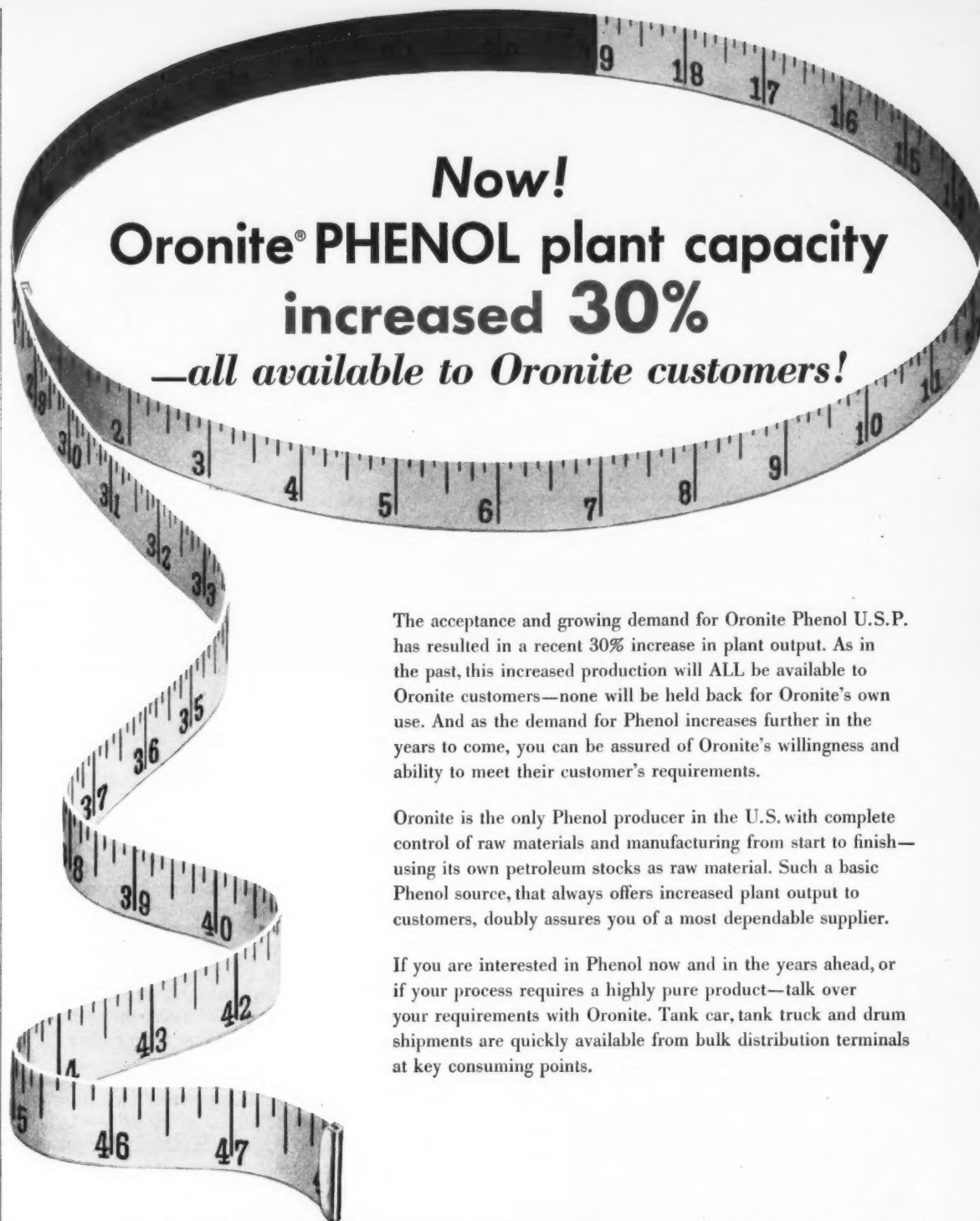
Solution: Within the last two years, synthetic flocculants have been used successfully. One, called Separan 2610, is a high-speed flocculating agent. Chemically, it is a high-mw acrylamide-type polymer, and it is best used as outlined here.

1) Recommendations call for 0.05% (or less) solutions for application. However, more-dilute solutions work best. If a given situation permits, application at concentrations as low as 0.0001% allows better distribution of the flocculant and gives better results.

2) These dilute solutions should be added in multiple stages in the feed to the settling or filtration zones, because the flocculant is strongly adsorbed on the surface of solids. If a portion of the solids becomes overtreated, the agent will not ordinarily redistribute to the untreated portion. That's why good distribution is important.

3) The treated solids should be agitated gently, as high shear forces will degrade all flocs.

(Please turn to next page)



Now! Oronite® PHENOL plant capacity increased 30% —all available to Oronite customers!

The acceptance and growing demand for Oronite Phenol U.S.P. has resulted in a recent 30% increase in plant output. As in the past, this increased production will ALL be available to Oronite customers—none will be held back for Oronite's own use. And as the demand for Phenol increases further in the years to come, you can be assured of Oronite's willingness and ability to meet their customer's requirements.

Oronite is the only Phenol producer in the U.S. with complete control of raw materials and manufacturing from start to finish—using its own petroleum stocks as raw material. Such a basic Phenol source, that always offers increased plant output to customers, doubly assures you of a most dependable supplier.

If you are interested in Phenol now and in the years ahead, or if your process requires a highly pure product—talk over your requirements with Oronite. Tank car, tank truck and drum shipments are quickly available from bulk distribution terminals at key consuming points.



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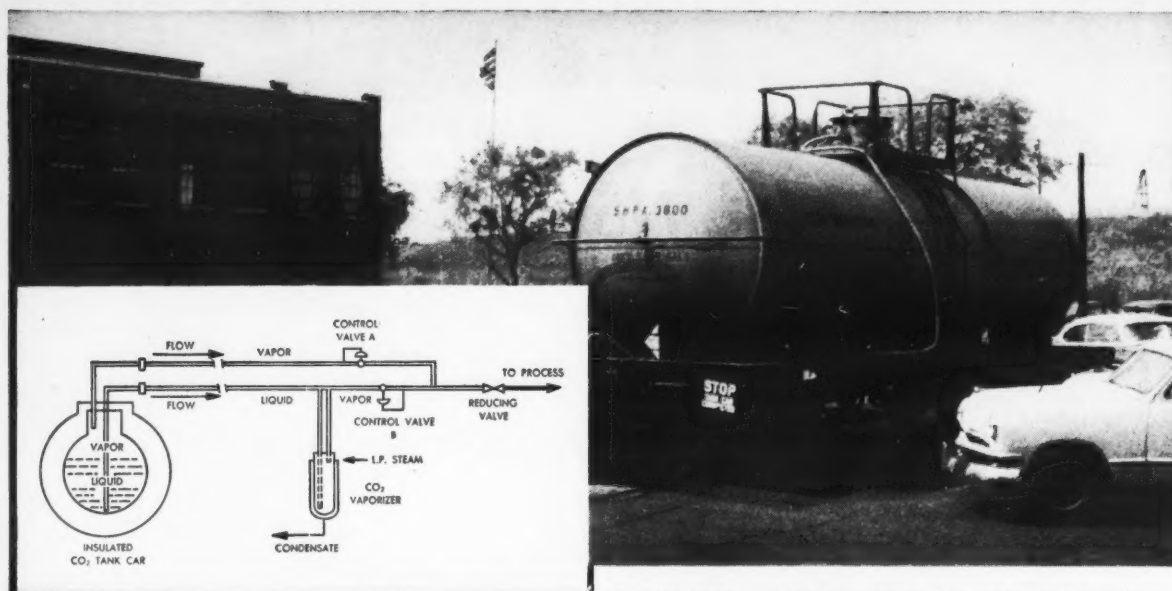
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HOW CO₂ TANK CAR UNLOADS ITSELF. CO₂ arrives in liquid form with vapor pressure of less than 300 lbs. psig. Diagram at left shows how automatic unloading system sends CO₂ vapor directly to process. (Control valve A is open when line pressure is 220 lbs. psig or higher. Valve B is open below 200 lbs. psig.) Photo courtesy of Pfister Chemical Works in Ridgefield, New Jersey.

CO₂ goes directly from tank car to process...

- eliminates expensive storage and refrigeration
- no need to handle CO₂ cylinders or convert dry ice
- cuts down maintenance and upkeep
- reclaims valuable plant space or land
- assures constant CO₂ flow that matches demand

Here's a remarkable, new, exclusive method of handling CO₂ shipments that may prove profitable to many users of carbon dioxide. It's Olin Mathieson's patented *Direct Unloading System*—CO₂, in which CO₂ vapor flows directly from special, insulated tank cars to your process...at rates of from 6 to 1500 lbs. per hour, varying directly with the demand.

This new system bypasses intermediate steps such as storage in refrigerated tanks, handling of cylinders, or converting dry ice, along with the expensive, extensive facilities that these require.

Completely automatic, this method requires no power—only a small, low-pressure steam line. The distance from spur to plant is generally immaterial. Olin Mathieson installs and main-

tains the system and leases the cars to you so that no demurrage occurs.

Direct unloading prevents any venting as long as CO₂ is used in process, while an uninterrupted flow is maintained by connecting the coupling stations in parallel along the spur. This allows a balanced switchover from emptying tank cars to full ones.

On-time shipments are assured by Olin Mathieson's CO₂ plant at Saltville, Va.,—the world's largest—and by Olin Mathieson's fleet of 24- and 30-ton insulated tank cars.

Direct Unloading System—CO₂ can be installed in a matter of weeks. Why not contact Olin Mathieson soon to see whether it can be profitably adapted to your operation.

4728



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INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

When inquiring check 3206 opposite last page

CHEMICAL MATERIALS

Solids Separation

(Continued from preceding page)



This 11½-ft diameter filter is one of three in series at Anaconda's Bluewater, New Mexico, mill. Using the carbonate circuit, flocculating agent contributes to forming the thick cake, seen falling from the rotating drum

Results: Agent has greatly reduced production costs of counter-current decantation, one of the main recovery processes for uranium. It is now indispensable to efficient operation of carbonate leach circuits. Separan 2610 permits the raw leaching of sandstone ores, whereas before, preliminary roasting had been required.

One Colorado mill estimates total savings of \$2000 a month can be credited to the agent. Labor and operating costs have been cut as filter cloth blinding has been reduced. Savings come to about \$4 for each \$1 spent on Separan. Management feels they might have trimmed \$70,000 from construction costs if agent were then available. They also use the agent to flocculate uranium-rich solids before filtering and leaching.

Another mill, which uses large thickeners to control sludge, found that the agent has increased tonnage by 20-25% in their primary leach circuit. A New Mexico mill, which was stymied on filtering their limestone ores, found that when they used this agent on their carbonate leach circuit they doubled filtration rates. The mill also finds their sandstone ores require the agent for effective filtration. In addition, they have no problem of buildup of organics in the treated systems.

This flocculating agent is proving to be not only an important factor in running an economic mill operation, but also has been vital to the whole AEC program.

Benefits to Other Mineral Industries

Other mineral industries besides uranium have benefited from Separan.

Copper — One processor has found that by using

CHEMICAL MATERIALS

this agent as a settling aid, he has increased water recovery from his tailings disposal system. His average underflow density went from 43% solids to over 53%, at times as high as 60%. Production has increased by 1600 tons/day after adding 0.0041 lb Separan 2610/ton of solids in the tailings.

Borax — Treatment has doubled thickener capacity for one operator, and increased filtration efficiency. Addition of 0.08 lb Separan/ton of solids gives efficient settling of clay impurities from hot borax streams.

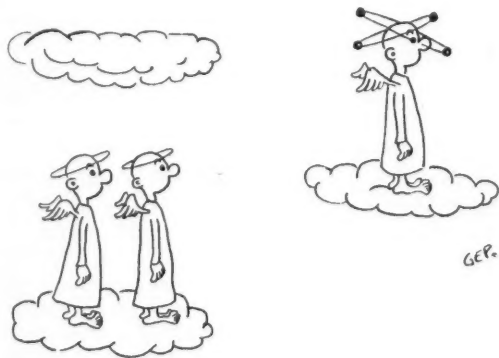
Phosphoric acid — The agent settles solids from the green acid and gives a higher finished acid purity. Separan loadings of 0.025 lb/ton of gypsum have improved filtration and wash rates by 1.4- to 2.3-fold, respectively.

(Separan 2610 is a product of The Dow Chemical Co., Midland, Mich. . . or for more information check 3207 on form opposite last page.)

Lists intermediates, salts, metallic soaps, fungicides

Manufacturer's chemicals and derivatives are listed in four-page bulletin. Intermediates, salts and metallic soaps, fungicides, preservatives, and antioxidants are covered in listing.

"Intermediates, Salts and Metallic Soaps" is issued by Chemo Puro Mfg. Corp., Dept. CP, 150 Doremus Ave., Newark 5, N.J. When inquiring specify 3208 on form which is located opposite last page.



Thanks to George E. Pekarek, The Glidden Company, Cleveland, O.



19' Fiberglass Caribbean Cruisette by Lone Star Boat Co.

Smooth Sailing — Enjoy it in your **Polyester Resin Production, too!**

From sleek power boats to colorful, fire-resistant building panels, your polyester resin customers are creating an ever-growing list of new and better products for the American consumer. As the demand for these better-looking, stronger, more durable polyester products expands, you'll be called upon to supply increasing amounts of high purity resins.

You'll discover several important advantages in making your polyester resins from Pittsburgh Phthalic and Maleic Anhydride. As a basic producer, Pittsburgh offers you materials that are quality-controlled from coal to container. The uniform purity of Pittsburgh P.A. and M.A. minimizes your quality control needs and eliminates many production problems. Pittsburgh

Phthalic is virtually a water-white product, enabling you to produce practically colorless resins which have good light transmission and which can be pigmented in a wide range of colors.

Pittsburgh's modern new Phthalic Anhydride plant—which doubles our output—is now in full production! You can rely on prompt on-schedule deliveries, in any form or quantity you need. For more information, call or wire for the services of a Pittsburgh Industrial Chemicals man.

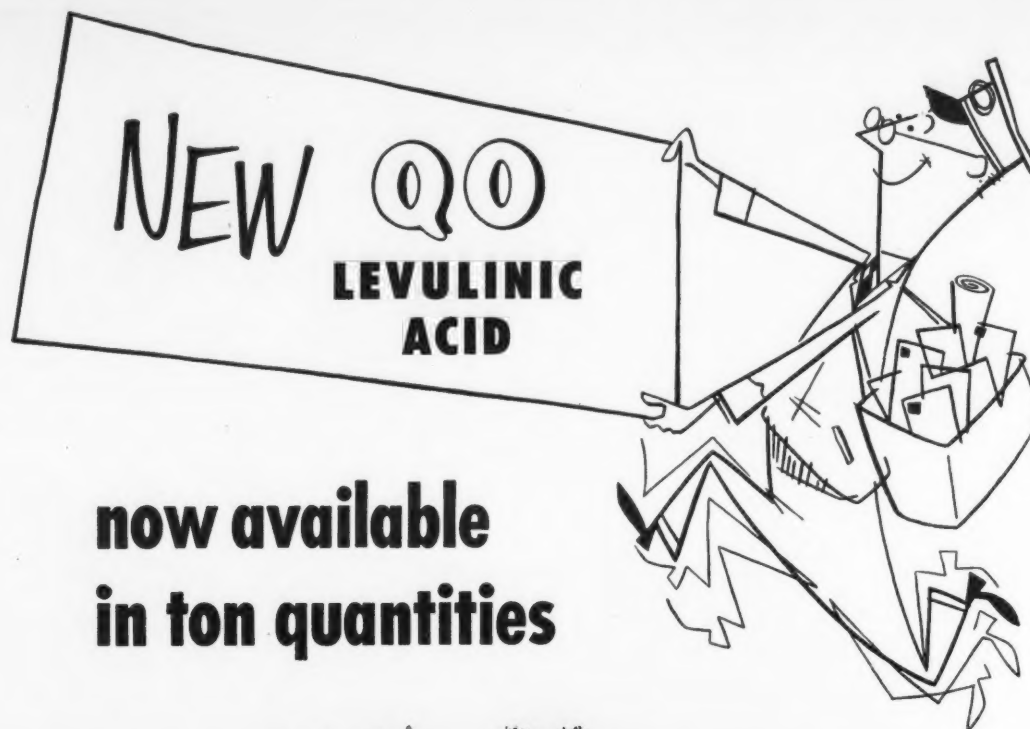


PITTSBURGH CHEMICALS for the plastics industry

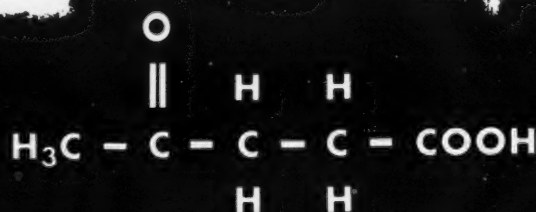
- PITTSBURGH PX PLASTICIZERS
- PHTHALIC ANHYDRIDE • MALEIC ANHYDRIDE
- PHENOL • ORTHO CRESOL
- META PARA CRESOL • BENZENE

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 3209 opposite last page



**now available
in ton quantities**



The Quaker Oats Company now offers QO levulinic acid—a new versatile raw material for the chemical industry. Now available in drums from our pilot plant, production will be expanded to meet industry's needs. This

versatile chemical can undergo the reactions of a ketone and an acid; it is unusual in that each of its three methylene groups is situated next to a carbonyl group.

WRITE US for a copy of our Bulletin on QO levulinic acid and a sample of this new product



The Quaker Oats Company
CHEMICALS DEPARTMENT

336B The Merchandise Mart, Chicago 54, Illinois
Room 536B, 120 Wall Street, New York 5, New York
Room 436B, 48 S.E. Hawthorne Blvd., Portland 14, Oregon

When inquiring check 3210 opposite last page

CHEMICAL MATERIALS

**Paper coatings are easy to make
and easy to apply when made
with latex . . .**

butadiene — styrene also makes the finished paper of fine quality

Uses: For making machine and off-machine coatings for printing paper.

Features: Coatings are easy to prepare and give trouble-free operation. Coated paper containing this latex is characterized by ease of calendering, high gloss, printability, high bond of coating to paper stock, smoothness, excellent wet rub resistance, and good light stability.

Description: The latex is white, has a 47-49% solids content and a viscosity of 25-27 cps @ 25°C. The ratio of butadiene to styrene is 65:35, pH is 10.0 ± 0.5, and sp gr is 1.015.

Films cast from the latex are smooth, water white, clear and tough, and have excellent surface adhesion. The latex is highly compatible with starch and dextrans, has excellent mechanical stability, and can be used with a wide range of pigments and clays.

(Dylex Latex K-52 is a product of Chemical Div., Koppers Co., Inc., Dept. CP, 1450 Koppers Bldg., Pittsburgh 19, Pa. . . or for more information check 3211 on Reader Service slip which is located opposite last page.)

**True PVAc copolymer makes clear,
tough, permanently flexible,
water-resistant paints . . .**

freeze-thaw characteristics of compounded paints are excellent

Uses: As a polyvinyl acetate emulsion for water-based paints and primer-sealers.

Features: Polymer yields good low-temp film formation in presence of high pigment loads. Films of the latex are permanently flexible, clear, tough, water resistant, and possess unusual light stability. Freeze-thaw characteristics of compounded paints are excellent and good stability is obtained without special compounding techniques.

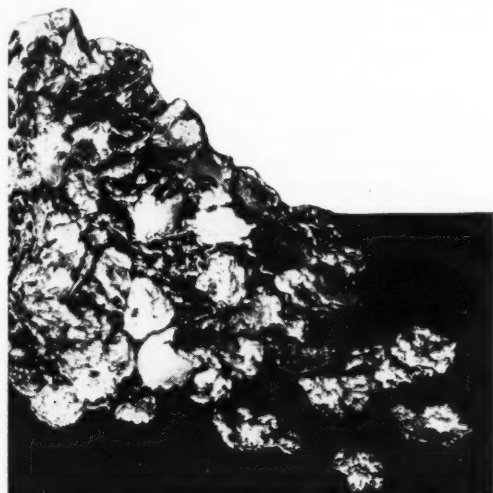
Description: Product is a true copolymer of vinyl acetate and a co-monomer. The emulsion paint vehicle is nonionic. Copolymer has a pH (@ 25°C) of 4-5 and its solids content is 55%. Viscosity (Brookfield) is 1000-1500 cp and sp gr is 1.10.

(Polyco 678-W is a product of Polyco-Monomer Dept., Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . or for more information check 3212 on form located opposite last page.)

**Pure zirconium in platelet form
is completely safe to handle,
yet melts like sponge**

Uses: Pure zirconium (that which is hafnium-free) is a valuable structural material for atomic reactors because of its extremely low nuclear cross-section and high corrosion and heat resistance. Because of hafnium's high neutron absorption characteristics, it must be removed from zirconium which will be used in nuclear reactors. Hafnium, however, does not have to be removed from zirconium used for other commercial purposes.

Features: Zirconium in platelet form is superior to conventional sponge form in that platelets are non-pyrophoric, non-hygroscopic, and are of extreme high purity, being almost completely free of sodium, magnesium, chlorides, hydrogen, and moisture. Freedom from impurities gives much cleaner melting. The platelets can be compacted for melting as easily as the sponge, and with virtually no waste.

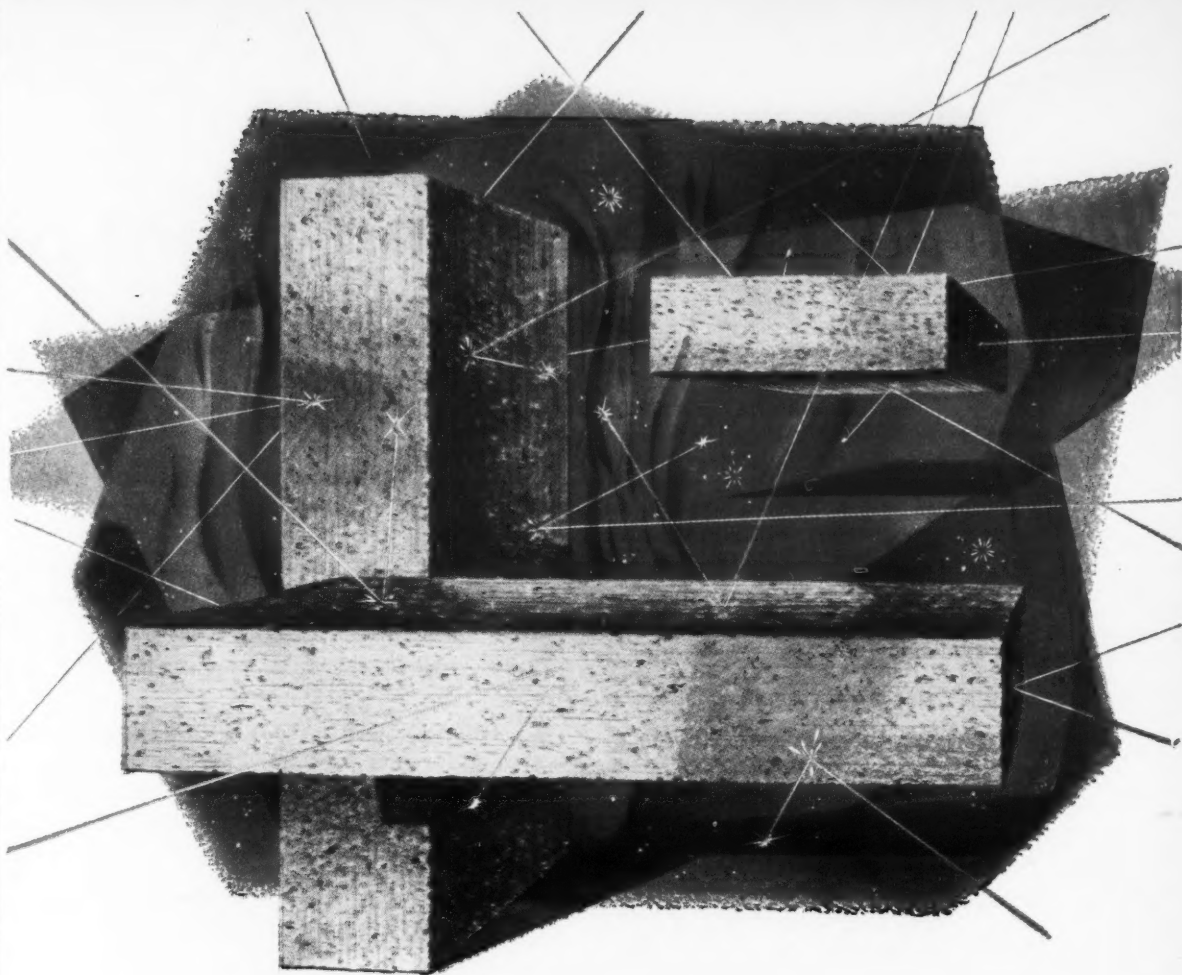


Zirconium platelets are irregular flake-like pieces about the size of dimes and quarters

Platelets are classified as metal, rather than metal sponge. They are not subject to any restrictions necessary for handling sponge, as they are completely safe to handle.

Description: Zirconium platelets will be supplied from manufacturer's 2,000,000 pound/year Ashtabula plant in two grades: reactor and commercial. The platelets are irregular flake-like pieces about the size of dimes and quarters. Present quotation for the reactor grade (Hf-free) is \$4.75 to \$6.50/lb (compared to about \$12/lb for sponge), and commercial-grade zirconium platelets will sell for about \$1.50 less per pound.

(Zirconium platelets are a product of U.S. Industrial Chemicals Co., Div. of National Distillers Products Corp., Dept. CP, 99 Park Ave., New York 16, N.Y. Check 3213 on form opposite last page.)



**Go ahead! Raise process temperatures
... refractories fortified with Alcoa Aluminas can take it**

Process temperatures continue to climb in industry's constant effort to raise production and product quality while cutting costs. That makes more important than ever the role of ALCOA® Aluminas in fortifying refractories. To see why, study these performance facts:

As alumina content of a refractory increases...

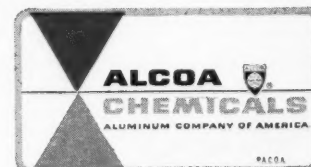
- strength and stability under load at high temperatures increase
- there is less spalling, abrasion and fluxing
- co-efficient of expansion decreases
- resistance to chemical attack improves
- effective service life grows longer and longer

For users of high alumina refractories, the money-making results are these: less downtime... less rebuilding... longer continuous equipment operation under uniform conditions to raise production tonnages and maintain product quality... easier product development.

First cost of high alumina refractories is surprisingly low, too... because ALCOA Aluminas are among the least costly, *uniformly pure oxides* available in quantity and suitable for refractory use.

Look at it as you will! Refractories fortified with ALCOA Aluminas are your best answer to the plaguing problems of suitable refractory performance in today's super-high temperature operations.

ALCOA does not make refractories! We will gladly refer you to a reliable supplier who uses ALCOA Aluminas to make *better* refractories. For additional information, write ALUMINUM COMPANY OF AMERICA, 705-E Alcoa Building, Pittsburgh 19, Pennsylvania.



THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

When inquiring check 3214 opposite last page



Uniformity is the ^{telling} selling point of

RAYETTE* industrial chemicals

(FORMERLY RAYMOND LABORATORIES, INC.)

***PENDIT® WA COSMETIC IS UNIFORM:** An aqueous sodium lauryl sulfate whose batch-to-batch consistency will eliminate at least one (often major) variable in your process. Pendit® WA Cosmetic is supplied in three viscosities, and other lauryl sulfate salts are also available.

CHECK THESE APPLICATIONS—DO THEY SUGGEST A NEW USE TO YOU?

- | | |
|------------------------------|--|
| ✓ Emulsion polymerization | ✓ Industrial emulsions |
| ✓ Fat liquoring leather | ✓ Preparation of liquid and paste cream shampoos |
| ✓ Acid peeling of fruits | |
| ✓ Metal plating | ✓ Cosmetic suspensions and emulsions |
| ✓ Metal cleaning | ✓ Liquid dishwashing compositions |
| ✓ Metal burnishing compounds | ✓ Car washes |
| ✓ Foaming fire extinguishers | ✓ Personal cleansing products |
| ✓ Textile scouring | |

***PENDIT® CA IS UNIFORM:** A quaternary ammonium compound of unvarying physical properties based on a stearyl dimethylbenzyl ammonium chloride. It is batch-tested to virtually eliminate consistency problems and is stabilized against separation in the drum.

CHECK THESE APPLICATIONS—DO THEY SUGGEST A NEW USE TO YOU?

- | | |
|---------------------|------------------------|
| ✓ Dairy sanitizer | ✓ Mold inhibitor |
| ✓ Paper conditioner | ✓ Industrial deodorant |
| ✓ Fabric softener | ✓ Germicide |
| ✓ Textile lubricant | ✓ Hair rinse |

THIOGLYCOLIC ACID IS UNIFORM: "Thio" and its salts are completely free of the oxidation product dithiodiglycolic acid. "Thio" is processed in special equipment to guard its cosmetic purity.

CHECK THESE APPLICATIONS—DO THEY SUGGEST A NEW USE TO YOU?

- ✓ Initiator for production of bis-phenol A
- ✓ Organo tin esters as polyvinyl chloride stabilizers
- ✓ Esters as chain transfer agents in emulsion polymerization
- ✓ Hair waving
- ✓ Stabilizer for acrylonitrile polymers
- ✓ Intermediate for extreme high pressure lube oil additives
- ✓ Depilatory
- ✓ Intermediate for special textile softening and dying agents

WRITE FOR TECHNICAL INFORMATION, SAMPLES AND PRICES

RAYETTE* inc.
Chemical Division

267 East Fifth, St. Paul 1, Minnesota

*Pendit® is a registered trade-mark of Rayette, Inc. Chemical Division

* FORMERLY:



When inquiring check 3215 opposite last page

CHEMICAL MATERIALS

Makes thin-walled articles that have good resistance to breakage . . .

polystyrene compound for automatic molding has low vapor permeability

Uses: For thin-walled articles, such as containers.

Features: Articles have improved resistance to breakage and lower vapor permeability. Compound exhibits greater resistance to stress cracking than general-purpose styrene, flows well at lower temperatures and pressures, and has excellent clarity. Product can be used in contact with food.

Description: Polystyrene molding compound is designed for use in fast-cycling, fully-automatic injection molding equipment, but can also be used in other types of molding machines.

(SMD-3700 Crystal 11 molding compound is a product of Bakelite Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. Check 3216 opp. last page.)

Low in sulfur and soluble salts, barium carbonate is suitable for wide variety of uses . . .

economical and has high purity, reacts readily even with weak acids

Uses: Lower density grade for applications with brick and tile, ceramics, masonry cement, medium density grade for water treatment application, in insecticides and rodenticides, as extender pigment in paints and filler in paper, rubber, as stabilizer for vinyl chloride resins, and as intermediate in manufacture of barium chemicals; high density grade used to lower melting point of glass.

Features: Product is low in sulfur and soluble salts, has high density, ability to form stable, insoluble barium sulfate, low fluxing temperature, and ease of decomposition to corresponding barium salts by relatively weak mineral or organic acids.

Description: Chemical grade of barium carbonate, 75C, is fine, white, crystalline powder. Grade 50F is fine, free-flowing grade with high reactivity and very low bulk density. Grade 135G has lower sulfur and iron content than other grades. It is relatively coarse, high density material. Bulk density in lb/cu ft for various grades is: 50F, 50; 75C, 70; 135G, 135. Assays are greater than 99.1% barium carbonate.

(Barium carbonates are available from Pigment, Color, and Chemical Div., Sherwin-Williams Co., Dept. CP, 300 W. Lake St., Chicago 6, Ill. . . or check 3217 on form opposite last page.)

Boron-10 available commercially . . .

efficient neutron absorber is used in shielding and in radiation dosimeters

Uses: A real future is seen for boron-10 in radiation shielding, especially when dispersed in carrying agents or fillers, such as plastics or paper. The isotope is also used in radiation control rods and in dosimeters, small instruments carried by workers in potentially radioactive areas. These instruments measure the amount of radioactivity absorbed by the individual.

Features: Boron-10 has about five times the efficiency of natural boron in absorbing thermal neutrons. It is 20 times better than lead and 500 times better than concrete.

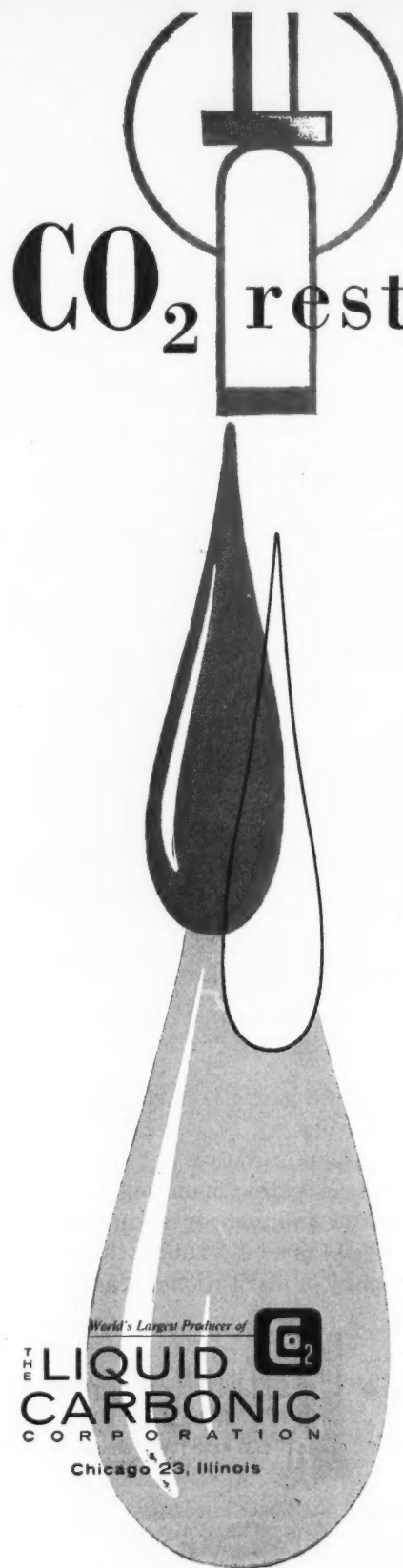
Description: Boron-10 resembles powdered graphite and is packed in polyethylene bags in metal cans. It is not radioactive. Present capacity of plant, located 12 miles from Niagara Falls, N.Y., is about three pounds per day.

(Plant is operated by Hooker Electrochemical Co., PO Box 344, Niagara Falls, N.Y. For more information contact Mr. F. W. Malone, Chief, Niagara Falls Branch, US Atomic Energy Commission, PO Box 388, Niagara Falls, N.Y.)



"Does this smell like ammonia to you?"

Thanks to A. E. Suckar, Esso Standard Oil Company, Linden, New Jersey.



WHEN TAPS SLOWED TO A TRICKLE

CO₂ restored the flow

A few years ago the water taps in one of our midwestern cities began to flow too gently. City engineers suspected the culprit was excess lime.

In the lime-soda ash process of water treatment it is customary to over-treat the water to assure maximum softening. This causes plugging of the water lines due to precipitation of the excess lime.

CO₂ SOLVES THE PROBLEM

Recarbonation of the treated water with CO₂ changed the lime to a more soluble form—and water pipes stayed free-flowing. The CO₂ system is successfully solving the lime problem in cities like Minneapolis, Minn., Columbus, Ohio, Eau Claire, Wis. and many other municipalities.

This is just one of hundreds of CO₂ applications that may lead you to a solution to one of your problems.

IS THERE A JOB FOR CO₂ IN YOUR PLANT?

Almost every day another manufacturer or processing plant finds that carbonic gas can improve the product, simplify an operation, cut cost, or increase safety.

CO₂ is now doing a job in such varied applications as these:

- Curing cores and molds for foundry castings
- Making possible low cost gas shielded welding
- De-flashing molded rubber products quickly at low cost
- Improving paints and varnishes
- Freeze-drying pharmaceuticals
- A low cost, safe, weak acid for neutralizing
- As an inert atmosphere to prevent fire and explosion
- And hundreds of other applications

Some of these may be of direct interest to you, others may be adaptable to your field. If you'd like a broader list, we'll be glad to send you our booklet "CO₂ Applications Unlimited". Just check it on the coupon below. If you'd like detailed technical data on any of the applications listed in this advertisement, check those in the coupon too.

- ☐ Curing Cores and Molds
- ☐ Rubber Tumbling
- ☐ Freeze-Drying
- ☐ Gas Shielded Welding
- ☐ Paint and Varnish Manufacture
- ☐ Other _____

THE LIQUID CARBONIC CORPORATION

3124 South Kedzie Avenue • Chicago 23, Illinois

Please send me a copy of "CO₂ Applications Unlimited" plus detailed information on the indicated uses of CO₂.

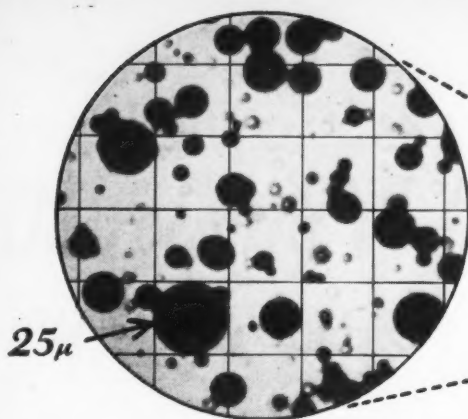
Name _____

Title _____ Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check 3218 opposite last page



Here's the *latest* on Lithium METAL DISPERSIONS

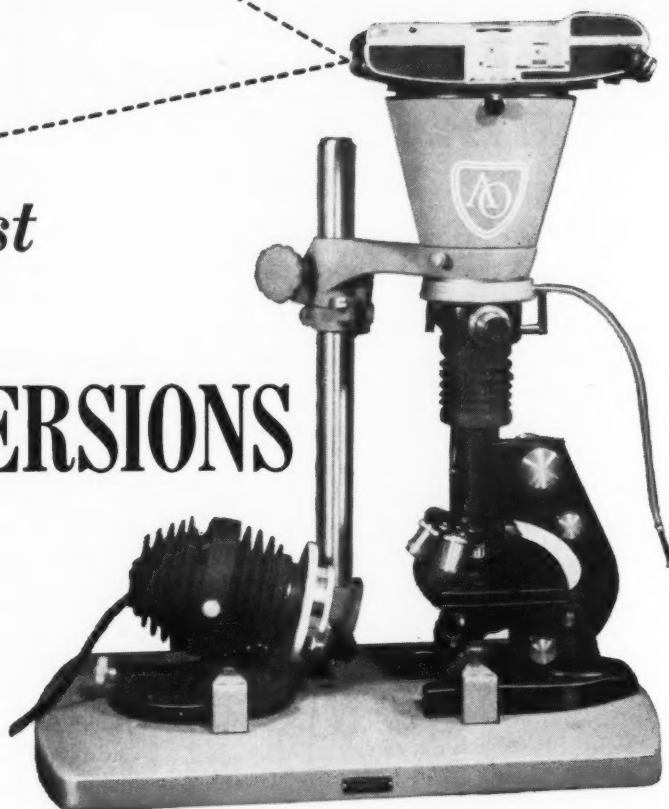
Got a catalyst problem?

Interest sparked by the discovery that lithium metal dispersions make unique polymerization catalysts (the polymerization of isoprene to a "natural" rubber) indicates a heretofore unexploited instrument of research.

Consequently, Lithium Corporation is now making available experimental quantities of dispersions of this highly reactive metal. These dispersions may be purchased in either mineral oil or a mineral oil-petrolatum combination as the dispersing medium. Dispersions in other media are available as special items. The "package" is obtainable in five sizes from 25 grams to 1 pound. Over 90%

of the lithium metal particles have a diameter less than 25 microns.

Specifications, information for preparing the dispersions including handling instructions, prices and product data on lithium metal may be obtained by submitting a request on company or institutional stationery.



Microscope and Illuminator by American Optical Company, Instrument Division, Buffalo, New York. Polaroid® Land Camera by Polaroid Corporation, Cambridge, Massachusetts.

... trends ahead in industrial applications for lithium



**LITHIUM CORPORATION
OF AMERICA, INC.**
2535 RAND TOWER, MINNEAPOLIS 2, MINN.

PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS
METAL DERIVATIVES: Amide • Hydride
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RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 3219 opposite last page

CHEMICAL MATERIALS

Broaden uses of epoxy resins for casting, other purposes

Two epoxy resins intended to widen uses for casting, laminating, encapsulating, and other purposes have been added to manufacturer's plastic materials line.

Maraset rubber-like resin 636 is a tough, flexible compound with high dimensional stability, resistance to heat and chemicals, excellent recovery characteristics, and good adhesion to many materials. It has a 200% elongation, and tensile strength of 2500-3500 psi. Resin 636 has been successfully used to face drop-hammer dies for multiple stamping of metal panels. It is also used for potting and sealing, encapsulating electronic components, and as an efficient and economical replacement for rubber or plastisol in gaskets and other applications.

Maraset casting resin 650 is a low-irritant formulation combining desirable characteristics of rigid and resilient epoxies in single resin system. Its rigidity is marked by Rockwell M 100 hardness and ultimate compressive strength of 40,000 psi. Resilient properties include elongation rate of between 3 and 5%, and impact strength of 7 ft-lb/in unnotched Izod. Resin 650 has specific gravity of 1.05. Opaque colors are available for diversity of tool and die applications. Formulation also comes in clear form for uses where transparency is desirable, as in producing models, prototypes, and housings.

(Maraset resins are produced by Marblette Corp., Dept. CP, 37-31 Thirtieth St., Long Island City 1, N.Y. . . . or for more information check 3220 on form opposite last page.)

DID YOU BORROW THIS COPY OF CP?

Would you like to receive your own copy regularly . . . for greater convenience in reading?

If you are responsible for processing operations in an administrative, production management, engineering or technical function, it may be possible to send you copies of CHEMICAL PROCESSING regularly, without charge.

Complete the request-form opposite the last page of this copy and send it along to us — no obligation, of course.

MATERIALS

Here's adhesive that sticks Mylar, Pliofilm, Saran, and polystyrene

Uses: For adhering Pliofilm, Saran, and polystyrene to foil, as well as Pliofilm to Saran, and Mylar to Pliofilm or Saran. It is also effective for other laminations including leather to metal.

Features: Material may be applied by reverse roller or gravure coating prior to lamination.

Description: Adhesive is clear, amber-colored synthetic rubber cement. It contains approximately 33% solids, and may be thinned with toluene, or mixture of toluene with MEK or ethyl acetate. Dilution to approximately 20% solids is desirable for lamination work.

Coating weight of 3 lb per ream for film-to-foil lamination, and 4 lb per ream for film-to-film lamination is recommended. Solvent should be removed at oven temperature of 200-250°F. "Nip" temp of 190°F at 150 ft min is desirable when laminating film to foil, or Mylar to Pliofilm or Saran. With Pliofilm to Saran, use drying temp of 125-150°F.

(Resyn 76-3963 is product of National Adhesive Div., National Starch Products Inc., Dept. CP, 270 Madison Ave., New York, N.Y. . . . or for more information check 3221 opp. last page.)

Applications, formulations for quaternaries

Chemical and physical characteristics of quaternary ammonium salts are listed in 16-page booklet. Applications and formulations are outlined.

"Arquads" is issued by Chemical Division, Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify 3222 opposite last page.

For more information on product at right, specify 3223 . . . see information request blank opposite last page.



COMMERCIAL APPLICATION
NOW PRACTICAL WITH
EXPANDED PRODUCTION

trimethylolpropane

produced in continuous volume . . . at low cost!

Trimethylolpropane . . . produced by Celanese' unique aldol condensation process . . . is now ready for commercial application at new low price. Specially developed processes which utilize Celanese-produced basic materials assure continuous large volume production, exceptional high purity.

Manufacturers of paints and protective coatings can now take full advantage of the better adhesion, color, color retention, hardness and chemical resistance offered by trimethylolpropane alkyds.

Processing of polyurethanes is made easier through the use of this free-flowing, flaked polyol. Formulations containing trimethylolpropane mix more readily with diisocyanates. Its low melting characteristics and low water content are added features of particular importance in polyurethane coating formulations.

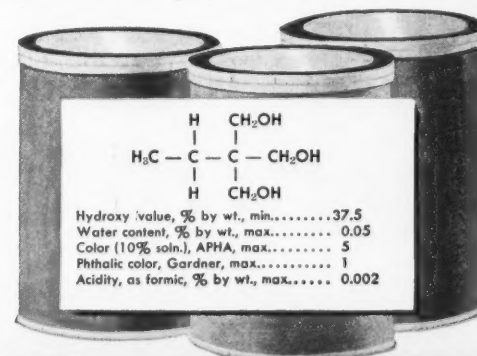
Rigid foams produced with polyesters containing trimethylol-

propane have higher heat distortion points and are less susceptible to shrinkage. Flexible foams based either on polyethers or polyesters are made tougher through the use of trimethylolpropane.

The properties of this new polyol open the door to the commercial development of other important production applications—synthetic lubricants, plasticizers, surface active agents, polyesters. How will trimethylolpropane fit in your formulations? Write for working samples, prices!

Celanese Corporation of America, Chemical Division, Dept. 591-E, 180 Madison Avenue, New York 16, N. Y. Celanese®

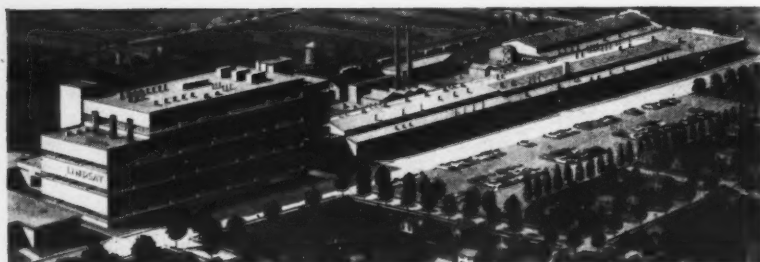
Celanese
CHEMICALS



Want a Carload of Rare Earths?

They're available for prompt shipment in a gram to a carload

a report by LINDSAY



Back in the early 20's, it would never have occurred to us that in a few years we would be shipping rare earth salts in carload quantities for a surprising variety of chemical and industrial applications.

For a long time, as you may know, the rare earths were simply a by-product of our regular business of producing thorium nitrate for gas mantles. Up to 35 years ago, rare earths were little more than scientific curiosities. Industry had not yet discovered them as a practical scientific tool.

But, as time sped by, we learned more about these unusual elements and how to produce them in larger quantities, in higher purities and at lower cost. And with their increasing availability, industry began to find ways to use them profitably in their operations. In the last ten years, we've seen a sharply increasing rise in the demand for rare earths from a rather amazing variety of industries.

WHY THIS DEMAND? Well, as we see it, it's due largely to the enormous technological strides made since World War II. Industry itself sparked much of this interest by its own explorations of the rare earth group in a search for materials to improve products and processes. Their studies in relation to specific problems often uncovered totally unsuspected applications. It

was a sort of chain reaction that is still increasing in velocity.

LINDSAY BUILT NEW PLANT. We saw what an industrial revolution the rare earths were creating. And anticipating heavy demands, we constructed our modern plant in 1953. The Lindsay plant facilities, including more recently developed and improved separation processes (such as our ion exchange systems), increased our production capacity manifold.

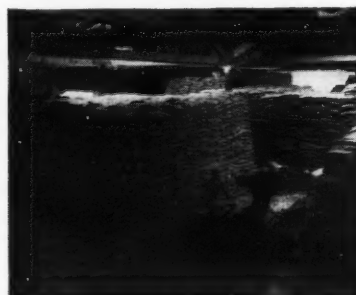
WHAT ARE THE RARE EARTHS? Rare earths are *not* rare—nor are they earths. This group of 15 elements (atomic numbers 57 through 71) are trivalent metals found together with thorium and yttrium primarily in monazite ore. In chemical properties they are almost identical, a fact which makes them difficult to separate and at the same time makes them valuable tools for research and industry.

HOW THEY ARE USED. The fascinating description of industrial applications of the rare earths would fill many books. We work with these materials every day and we're constantly amazed at the variety of ways in which they're used. Here are only a few. Glass polishing. Steel additives. Catalysts. Colorizer and decolorizer for glass. Medications. Ultra-violet light absorber. Arc carbon

electrode cores. Aluminum and magnesium alloys. Lighter flints. Radiation-proof glass. Waterproofing. Textile production. Color TV tubes . . . and the list goes on and on.

RARE EARTH SALTS. Lindsay produces rare earth salts in large tonnages and in varying purities. Most of them are surprisingly low in cost. Rare earth chloride—for example—a mixture of several of these elements—is only about 25¢ a pound and available in virtually unlimited quantities. High purity separated rare earths are, of course, more expensive, but economical in relation to the wonders they perform.

HUGE SOURCE OF SUPPLY. To keep up with the demand and assure industries of a steady supply, we maintain in our plant a stockpile of monazite that is now 24,000,000 pounds. And we're constantly prospecting in various parts of the world for this miracle ore—source of the versatile rare earths.



WORTH INVESTIGATING. Your research people may find it rewarding and profitable to study the possibilities of the application of rare earths to your own products and processes. We will be happy to supply pertinent data and to make available to you the help of Lindsay's technical staff.

CHEMICAL MATERIALS

Develop oxides and metals of columbium, tantalum up to 99.5% purity

Columbium, also known as niobium, has been developed in a metal state of high purity (99.5%). It has highly desirable characteristics that are needed in chemical processing and atomic energy fields. A technical grade of oxide and metal will be made available for industrial research work and commercial purposes. Metal granules range in size from 3/16" to 40 mesh. Oxides are furnished in fine powder of approximately 200 mesh. Specifications for metals are:

	Columbium	Tantalum
Cb	98.50% (Min)	0.50% (Max)
Ta	0.25% (Max)	98.50% (Min)
Ti	0.15% (Max)	0.25% (Max)
Si	0.15% (Max)	0.25% (Max)
Fe	0.30% (Max)	0.10% (Max)
C	0.40% (Max)	0.50% (Max)

Tantalum metal and oxide, also of 99.5% purity, is being made on production basis along with columbium. Widespread use of this material is being made in several fields, especially in making electronic components. Metal granules are furnished in -20 mesh size. Oxide comes in fine powder of approximately 200 mesh. Oxide specifications are:

	Columbium	Tantalum
Cb ₂ O ₅	98.75-99.50%	0.50% (Max)
Ta ₂ O ₅	0.25% (Max)	98.75-99.50%
TiO ₂	.10% (Max)	.20% (Max)
SiO ₂	.10% (Max)	.25% (Max)
Fe ₂ O ₃	.25% (Max)	.10% (Max)
Ignition loss	.40% (Max)	.40% (Max)

(Columbium and Tantalum are available from Kennametal Inc., Dept. CP, Latrobe, Pa. . . or for more information check 3225 on the convenient Reader Service slip which is located opposite last page.)

Will eliminate suede's "oil hunger", making it water-repellent and oil-resistant . . .

treatment also protects against perspiration and safeguards against fungi

Uses: Treatment for making suede water-repellent and oil-resistant before and after dry-cleaning.

Features: Stain-repeller also protects against perspiration and safeguards against fungi in hot climates, especially important for military applications.

Description: Stain-repeller for leather has fluorochemical base. Treatment is applied in drum during wet processing of skins, following their tanning, and substitutes for usual "fat-liquoring"

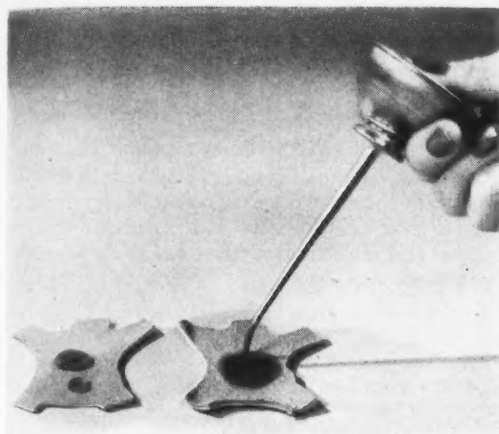
PLEASE ADDRESS INQUIRIES TO:



LINDSAY CHEMICAL COMPANY

288 ANN STREET • WEST CHICAGO, ILLINOIS

When inquiring check 3224 opposite last page



SAE 40 motor oil beads up on surface of suede sample treated with Scotchgard stain-repeller. Sample at right, with best previous repellent treatment, shows typical "oil hunger" found in untreated suede

step. Weight added to suede by treatment is 3% of total weight as against 4-8% for ordinary fat liquors and 8-15% for best previous water-repellent treatment for suede.

Stain-repeller works by forcing oily and watery staining fluids to bead up on surface of suede where they can easily be blotted or shaken off. Dirt and dust may be brushed away. Treatment will initially be offered to leather manufacturers through tanners John Flynn & Sons, Inc., Salem, Mass., and A.C. Lawrence Leather Co., Peabody, Mass. Manufacturer previously announced first treatment in history of textile industry to impart both oil- and water-repellency to fabrics.

("Scotchgard" brand stain-repeller for leather is product of Minnesota Mining and Manufacturing Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. Check 3226 opposite last page.)

Detailed technical discussions of pigmentation in papers

Series of five detailed reports give comprehensive information on exhaustive tests of Mistron pigments, which improve brightness, opacity, and printability of coated papers. Reports cover pigmentation of synthetic latex paper coatings, alpha-protein paper coatings, preparation of latex coating colors, effects of various latex/alpha-protein ratios in coating colors, and latex coating colors with Mistron and other pigments. All have many tables and graphs, and range from 12 to 22 pages in length.

Tech Reports 36-T to 40-T are issued by Sierra Talc and Clay Co., Dept. CP, PO Box 390, South Pasadena, Calif. When inquiring check 3227 on form opposite last page.

Allyl Chloride $\text{CH}_2 = \text{CH} - \text{CH}_2\text{Cl}$

Allyl Alcohol $\text{CH}_2 = \text{CH} - \text{CH}_2\text{OH}$

Intermediates for...



SHELL CHEMICAL pioneered the production of high purity allyl chloride and allyl alcohol. Today, they have become important intermediates for many valuable chemicals.

Both chemicals are available in drums

and tank cars. Conveniently located depots assure prompt shipment.

Your Shell Chemical representative will gladly discuss your allyl alcohol and allyl chloride requirements with you. Write for samples.

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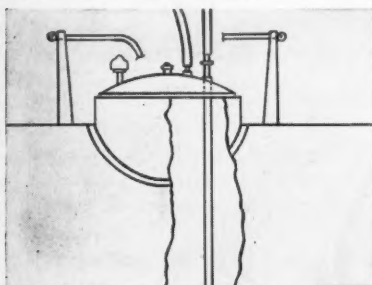
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BRIEFS

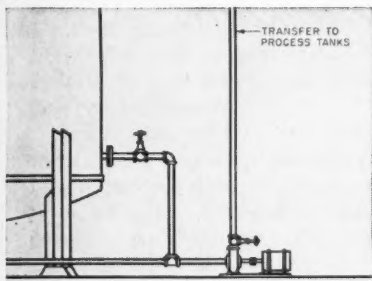
for buyers of

Caustic Soda
Chlorinated Solvents
Phosphorus Chlorides

Caustic soda handling



from tank car



to process ... is the subject of *Caustic Soda Engineering and Handling Guide*, the newest Hooker bulletin.

Contents include recommended methods for unloading, diluting, piping, and storing liquid caustic soda.

You'll also find advice on construction materials, detailed diagrams of equipment in typical installations, and a section on safety.

There are 18 full-page graphs, charts, and tables with which you can predict and control the behavior of liquid caustic soda under different operating conditions.

For a copy, check the coupon for Bulletin 102.

Now you can get these five chlorinated solvents from Hooker

All five of the following solvents are completely miscible with acetone, benzol, butanol, carbon tetrachloride, diethyl ether, ethylene dichloride, linseed oil, petroleum ether, methanol, and Solvesso No. 2.

None are classified as flammable under ICC regulations.

ortho-Dichlorobenzene

Freezing point -18° to -22°C.
Distillation range 4°C. inc. 179.5°C.
Specific gravity (15.5°/15.5°C.) 1.313

Monochlorobenzene

Freezing point -44°C.
Distillation range 1°C. inc. 132°C.
Specific gravity (15.5°/15.5°C.) 1.113

Monochlorotoluene

Freezing point below -45°C.
Distillation range 158.3° to 161.7°C.
Specific gravity (15.5°/15.5°C.) 1.080

Trichlorobenzene

Freezing point 10°C. Max.
Distillation range 5°C. Max. inc. 216°C.
Specific gravity (15.5°/15.5°C.) 1.466

Nialk® Trichlorethylene

Freezing point -86.4°C.
Distillation range 86.6° to 87.8°C.
Specific gravity (15°/4°C.) 1.469

If you would like specifications and other data on these Hooker solvents, please check the coupon.

Three chemicals meant for browsing—compliments of Oldbury® Products

The only claims to fame possessed by our two phosphorus chlorides and our phosphorus oxychlorides are these:

They're extremely versatile intermediates.

They might just be what you're looking for.

All three are high in quality and purity.

Our PHOSPHORUS TRICHLORIDE (PCl_3 , as you might guess) is used chiefly as a chlorinating agent. It's particularly useful in the preparation of acid chlorides where it undergoes reactions similar to those of thionyl chloride (which we also sell). If you're interested in making phosphite or phosphonate esters, you'll discover it's useful there, too. Two more mundane uses are as a condensing agent and as a catalyst.

Oldbury PHOSPHORUS PENTACHLORIDE is naturally even more reactive than the trichloride. Except for this greater reactivity, its reactions are much the same in nature as trichloride's.

Quite a different product, however, is Oldbury PHOSPHORUS OXYCHLORIDE ($POCl_3$). You can use this to make organic phosphates such as *tricresyl phosphate*, which you might use in plasticizers, gasoline additives, or what have you. Of course, you could also use this compound to replace various groups with chlorine.

For more information about these Oldbury products, check the coupon.

For more information on chemicals mentioned here, check below:

- ☐ *Caustic Soda Engineering and Handling Guide*, Bul. 102
- ☐ ortho-Dichlorobenzene
- ☐ Monochlorobenzene
- ☐ Monochlorotoluene
- ☐ Trichlorobenzene
- ☐ Trichlorethylene
- ☐ Phosphorus Trichloride
- ☐ Phosphorus Pentachloride
- ☐ Phosphorus Oxychloride

Clip to your letterhead and mail to us with your name and title.

CHEMICAL MATERIALS

Flexible urethane foams don't deteriorate, are reproducible

Uses: For making flexible urethane foams.

Features: Polyester produces reproducible foams that show minimum deterioration and have low compression set when exposed to accelerated humidity aging. Polyester has narrow hydroxyl number and viscosity range, as well as a uniformly low moisture content.

Description: Polyester is made under rigidly controlled conditions, has:

Hydroxyl number	49-55
Acid number (max)	2.0
Viscosity (cps, Brookfield model LVF, spindle #4, 12 rpm @ 25°C)	18,000-21,000
Color (Gardner 1933, max)	3
Water content (Karl Fischer, max %)	0.1
Sp gr (25°C)	1.19
Appearance	clear

(Foamrex No. 50 polyester is a product of Witco Chemical Co., Dept. CP, 122 E. 42nd St., New York 17, N.Y. . . . or for more information check 3230 on form which is located opposite last page.)

Dimethylhydantoin bibliography

Physical properties and chemical reactions of dimethylhydantoin (DMH) and derivatives are given in six-page bibliography, punched for insertion in looseleaf binder. Reactions with mineral acids, alkalis, acetic anhydride, methylating agents, chlorine, formaldehyde and noble metal salts are included. 35 DMH and 41 derivative references are listed.

DMH bibliography is issued by Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. When inquiring specify 3231 on the convenient Reader Service slip which is located opposite last page.

Tells story of lanolin industry and gives formulations

Early history and development of the lanolin industry is traced in 24-page brochure. Chemical composition, physical properties, and principal uses are briefly reviewed. Formulations for creams, lotions, oils, and shampoos are listed. Manufacturer's production facilities are illustrated by full-page photos.

Bul 52 is issued by Robinson, Wagner Co., Inc., Dept. CP, Mamaroneck, N.Y. When inquiring reader may simply specify 3232 on the convenient Reader Service slip which is located opposite last page.



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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Cabot Plans Silicon Dioxide Unit to Integrate With U.S.I.'s Tuscola Plants

Cabot Carbon Company, a subsidiary of Godfrey L. Cabot, Inc., Boston, Mass., has announced plans to build a silicon dioxide plant at Tuscola, Illinois. It will be located near U.S.I.'s ammonia plant and the ethyl chloride facility of National Petro-Chemicals Corporation (subsidiary of U.S.I.), and it will take advantage of raw materials supplied by these plants.

Raw materials used in the production of Cabot's finely divided silicon dioxide Cab-O-Sil* are silicon carbide, chlorine and hydrogen. The process used is a vapor-phase hydrolysis of silicon tetrachloride in a hot gaseous environment. This process utilizes hydrogen given off at Petro's ethylene cracker and purified in U.S.I.'s ammonia plant. In addition, Cabot will get steam and water from

MORE

Water-Alcohol Injection To Turbo-Jet Engine Cuts Aircraft Take-Off Distance

The water-alcohol injection technique, now used in the J47 gas turbine engines which power the B-47 bombers, has good possibilities in commercial jet aircraft design. It is reported to cut ground run distance and to be the most satisfactory way to increase overloaded safety on short fields. And it may be the answer to high-altitude field take-offs of commercial transports on hot days.

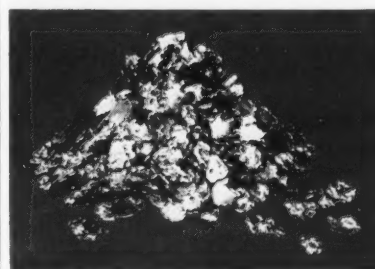
When injected into the combustion chamber of a turbo-jet engine, water is vaporized to steam which expands and increases the thrust. 28% alcohol is added to burn and so neutralize the cooling effect of the water. The B-47 bombers operate on 650 pounds per second of the water-alcohol mixture. They get about 22% increase in thrust, and 2,000 feet are cut from their ground run distance.

Chemical Buyers Get Tips On Raising Company Profits

Suggestions on how to increase company profits by making full use of vendor services were heard by the Chemical and Allied Buyers Group of the National Association of Purchasing Agents at their annual midwinter conferences held in New York and Chicago during January of this year.

In panel discussions, many specific vendor services were mentioned as being money savers for the chemical buyer's company. Among them: research and statistical data procurement, package development, raw material analysis, preparing detailed shop drawings from general specifications and sketches, special inventory stocking, consolidation of shipments and billings, specially tailored materials handling units, and employee training programs.

Keynoter for these panels emphasized use of a vendor's technical personnel and research facilities in solving mutual problems.



U.S.I. to Make Zirconium as Non-Pyrophoric Platelets

Production Plan Expanded To 2,000,000 Lbs. a Year

Reactor and commercial-grade zirconium, in the unique form of non-pyrophoric, non-hygroscopic platelets rather than sponge, will be supplied to government and industry from the U.S.I. zirconium plant at Ashtabula, Ohio, scheduled to come onstream in the second quarter of this year.

Platelets—irregular flake-like pieces about the size of dimes and quarters—insure greater safety during handling and shipping. Since they are classified as metal rather than as metal sponge, they are subject to none of the restrictions applied when the sponge form is handled. For safety reasons, the Interstate Commerce Commission requires that sponge be shipped in metal drums containing not more than 75 pounds, and that the sponge be contained in polyethylene bags and blanketed by argon gas. None of these restrictions apply to platelets.

Zirconium platelets can be compacted for melting as easily as sponge and with virtually no waste. They are of extremely high purity, being almost completely free of sodium, magnesium, chlorides, hydrogen and moisture. Freedom from impurities provides for a much cleaner melting operation for the user.

MORE

Polyethylene Resins Are Now Being Foamed

Polyethylene can now be obtained from processors as an expanded, closed-cell, flexible foam in extruded and molded forms. The cells are small and uniform and contain a harmless, inert gas.

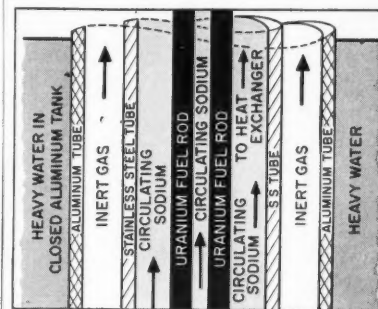
Indications are that the foamed material retains all the basic, desirable properties of polyethylene—its flexibility, toughness, chemical resistance and moisture resistance. The foam won't flake or dust. It is being evaluated for gaskets, cap and closure linings, insulation, shock absorbers, packaging, buoys and life floats, and for radiation shielding.

Foam density can be varied from 10 to 50 pounds per cubic foot. As density goes up, tensile strength and load recovery increase and deformation decreases. To date polyethylene foam has been fabricated with common wood and metal working tools, and has been drilled, machined, sawed, hot gas welded and friction and heat sealed.

First Sodium-Deuterium Reactor Authorized by AEC

Long considered almost ideal by nuclear experts, a sodium-deuterium power reactor has been authorized by the AEC. It is planned for construction at Anchorage, Alaska in 1962, and is being developed by Nuclear Development Corporation of America. The proposed reactor will use heavy water as moderator, liquid sodium as coolant and slightly enriched uranium as fuel.

The reactor will consist of an aluminum tank filled with heavy water, tightly sealed except for a closed-cycle fuel system passing through the tank. The fuel system consists in part of a number of fuel tubes, each tube being made up of two concentric pipes. Sodium flows through the inner pipe past uranium fuel rods, picking up the heat created by the fuel rods and transferring it to a heat exchange system. An inert gas under pressure flows through the outer pipe. This gas serves to insulate the inner pipe and will be at a pressure higher than that of the water or sodium, minimizing the possibility of contact should a leak develop.



Cross-section of one fuel tube passing through sealed aluminum tank filled with heavy water. Tube consists of two concentric pipes. Inner pipe contains uranium and sodium. Outer pipe contains inert gas.

Advantages claimed for this system include: operation on low-enriched fuel; long fuel life-time; more complete burnup of U-235 and the plutonium produced; delivery of heat at very high temperatures without high pressures; low pressure for entire reactor system, eliminating need for expensive pressure vessel; absorption by moderator of fewer neutrons than light water or graphite; suitability over wide range of power levels without radical design changes.

Argon Grade Sodium Frequently Used

Liquid sodium is used as a coolant in two other types of nuclear energy systems—the sodium-graphite and fast-breeder reactors. One fast-breeder now under construction will use U.S.I.'s Argon Grade Sodium as coolant material.

This grade of the metal is carefully filtered free of oxide to avoid corrosion in lines and other parts of the heat transfer system. It is processed and packed under a blanket of inert argon gas to maintain the oxide-free condition.

U.S.I. CHEMICAL NEWS

CONTINUED Zirconium

Production Goal Expanded

Originally scheduled to produce 1,500,000 pounds a year, the plant is now slated to turn out 2,000,000 pounds annually. Under a contract signed on May 1, 1956, 83,000 pounds a month are committed to the Atomic Energy Commission. An equal amount will be offered to industrial users.

U.S.I. is now quoting prices of \$4.75 to \$6.50 per pound, depending on quantity, for its hafnium-free zirconium platelets as compared with the present price of \$12.00 per pound for sponge. This is due to U.S.I.'s economical sodium process—the first semi-continuous process for making zirconium—which requires a lower initial investment than the conventional magnesium process.

Commercial zirconium which is not hafnium-free and which is suitable for non-nuclear uses will sell for about a dollar and a half less per pound.

Industry Will Get Hafnium

The forthcoming plant will also have 20,000 pounds of hafnium as hafnium oxide or sponge available for industrial use. Hafnium, an excellent neutron absorber, is employed in atomic reactors as a control rod material.

Amino Acid Deficiencies Cause Damage to Nervous System and Vital Organs

According to recent laboratory studies on experimental animals, serious disturbances in the higher nervous system, as evidenced by lower reflex action, can be caused by deficiencies in lysine and methionine. Degeneration of the liver, pancreas and kidneys may also result.

Five weeks on a balanced diet restored the activity of the organs affected, but part of the reflex damage appeared to be permanent.

CONTINUED Silicon Dioxide

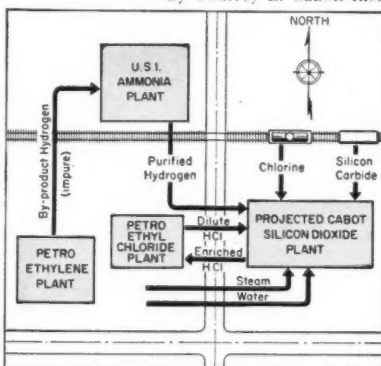
Petro Uses By-Product HCl

By-product hydrochloric acid from Cabot's new plant will be used in National Petro-Chemicals' ethyl chloride plant. A stream of hydrochloric acid will circulate between Petro's ethyl chloride facility and Cabot. By-product hydrogen chloride from Cabot's new plant will enrich the circulating stream, and will be removed at Petro for use as a raw material in the ethyl chloride unit. Hydrogen chloride for this unit is currently being made by burning hydrogen with chlorine.

Unit Produces "White Carbon Black"

Cab-O-Sil silicon dioxide—a white pigment frequently called "white carbon black"—is now produced for Cabot in Germany, but increasing demand has made an American plant necessary. The new unit will have an initial capacity of about 100 carloads per year. The product is claimed to surpass the precipitated type synthetic silicas for reinforcing plastics and rubbers, as a suspending agent in paints, a flattening agent in varnish, a gelling agent in lubricants, an anti-slip agent in wax and in the insulation of electrical equipment and many other fields.

*@by Godfrey L. Cabot, Inc.



Flowsheet showing interrelation of Petro, U.S.I. and Cabot plants at Tuscola, Illinois.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Formulation for a witch hazel foam shave cream is now being offered by manufacturer. Witch hazel distillate is claimed to lend refreshing cleansing and soothing qualities to this new aerosol foam shave cream formulation. (No. 1220)

Four new antistatic agents for polyethylene are reported to destaticize permanently. A half to one per cent is incorporated into polyethylene pellets or powder before extrusion or molding. Used on high and low pressure resins. (No. 1221)

Portable paper laminator which can be used to preserve documents is described in a recent pamphlet accompanied by a price sheet which is itself covered with the preserving film. (No. 1222)

To fireproof fabrics right in the home, a powdered anti-flame agent has been developed which is non-toxic and does not harm the appearance, hand or comfort of the fabric. Used as a rinse after the regular wash, it must be reapplied after each laundering. (No. 1223)

New marking ink for plastics and other hard surfaces uses pigments to get highly opaque colors. Is claimed non-corrosive, non-etching, fast-drying and with excellent adhesion. Wears well and resists water, many solvents. (No. 1224)

The flavoring of pharmaceuticals is discussed in a new catalog which gives for the first time a truly comprehensive list of materials developed for or adapted to this purpose. Guide is carefully indexed and cross-referenced. (No. 1225)

Induction furnaces for analyzing hydrogen in titanium and zirconium can now be obtained, reported to handle samples up to 10 grams in solid, drilling or chip form. Sample is burned in oxygen and resulting water is weighed. (No. 1226)

Sterile polyethylene bags are used to pack petri dishes containing ready-to-streak culture media. Now available in this pack are nine different culture media used in routine bacteriology and mycology. (No. 1227)

New unit for operating laboratory water baths combines in one piece of apparatus a self-contained heater, controller, stirrer and circulator with a built-in pneumatic control system claimed sensitive within $\pm 0.05^\circ\text{C}$. (No. 1228)

New dry film lubricant for drawing and forming titanium and its alloys, chromium and stainless steels at 600-1400°F has been formulated. Consists of fine graphite plus high-temperature binder dispersed in aromatic solvents. (No. 1229)

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.

Chlorine: liquid, in tank cars.

Caustic Soda: 50% liquid, in tank cars.

Sodium Peroxide: dust-free granules, in drums.

Sodium Sulfate

Sulfuric Acid: all strengths, 60° Baumé to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.

Phosphoric Acid

Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons.

Nitrogen Fertilizer Solutions

Ammonium Nitrate: 83%

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

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Intermediates and Fine Chemicals: Acetoacetylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D₂ and K₃ Products, Antioxidant (BHT) Products, Special Mixes.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

Metals: Titanium Sponge, Zirconium Sponge, Zirconium Platelets, Hafnium Oxide, Hafnium Sponge.

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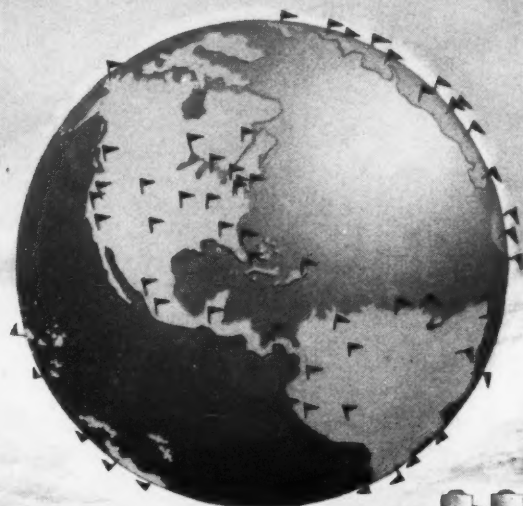
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Ceramic	Optical
Cement and Concrete	Paint, Varnish and Lacquer
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Disinfectants	Petroleum
Electrical Manufacturing	Pharmaceutical
Electroplating	Photographic
Enamel	Porcelain Enamel
Engraving and	Plastics
Electrotyping	Pottery
Feed Stuff, Mineral Feed	Printing Ink
Fertilizer	Pyrrotechnic
Food	Refractories
Glass	Rubber
Insecticide and Fungicide	Shade Cloth
Laundry	Soaps
Leather	Textile
Lithographing	Veterinary Remedies
Linoleum and Floor	Welding Electrodes
Covering	Wall Paper
Lubricant	

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Ceramic Opacifiers and
Colors

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many chemicals available from Harshaw.

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Those in attendance at the Twelfth Annual
Conference of the Reinforced Plastics Division
of The Society of the Plastics Industry in Chicago
in February heard an interesting symposium on
materials for reinforced plastics. We felt that you,
too, would like to listen in on

What's new in reinforced plas

Resins — The reinforced plastics market is now about 140 million pounds a year, a 20-fold increase in just 10 years. Of this, resins comprise half. The most popular resins by far are the polyesters — 65 million pounds of the 70 million pound annual resin consumption are polyesters. But the heyday may soon be over. Polyesters are suffering from "research atrophy." Many producers feel that further growth will depend on cheaper production techniques, such as premix molding, not improved products.

Epoxies, although accounting for only four million pounds — or about 6% — of the resin market, are the really bright stars on the horizon. They have already displaced polyesters in applications that demand dimensional stability and thermal and mechanical shock resistance. They are even preferred for patching and cementing polyester products. So far, the big drawbacks to epoxies have been their higher cost and that some give colored products. Both these problems — and many others, such as hardening agents — are being tackled by the researcher, and right now he's looking through rose-colored glasses.



Symposium was comprised of Messrs. John I. Wheeler, George Lubin, Semond Levitt, Irving N. Einhorn, Dr. Alex Sacher, and Frank W. Reinhart, US Department of Commerce, presiding. Small photo shows Dr. Irving Skiest, and Richard J. Savage, vice chairman



CHEMICAL PROCESSING

forced plastic materials

Here's what was said about
resins, reinforcements, fillers, core materials,
and prepreg molding materials

Although the phenolics were the original reinforced resins, they comprise less than 1% of today's production. They are getting back into the swim, however, as more applications demand their good adhesion, resistance, and high modulus. The air-craft designers are looking to phenolic laminates for hope in piercing the heat barrier.

The importance of cure cannot be overstressed. Proper cure gives optimum physical properties, and if the time can be cut too, more production can be eked out of existing equipment.

Reinforcements — Glass fiber is still the main standby, but sisal, asbestos, and cotton are also becoming popular with low-pressure molders because of their low cost. Synthetic fibers are being used in top quality smooth-surface moldings, and where improved abrasion resistance is needed. Metal fibers are being tried to give increased heat conduction and strength. Increased stiffness is given by using asbestos fibers.

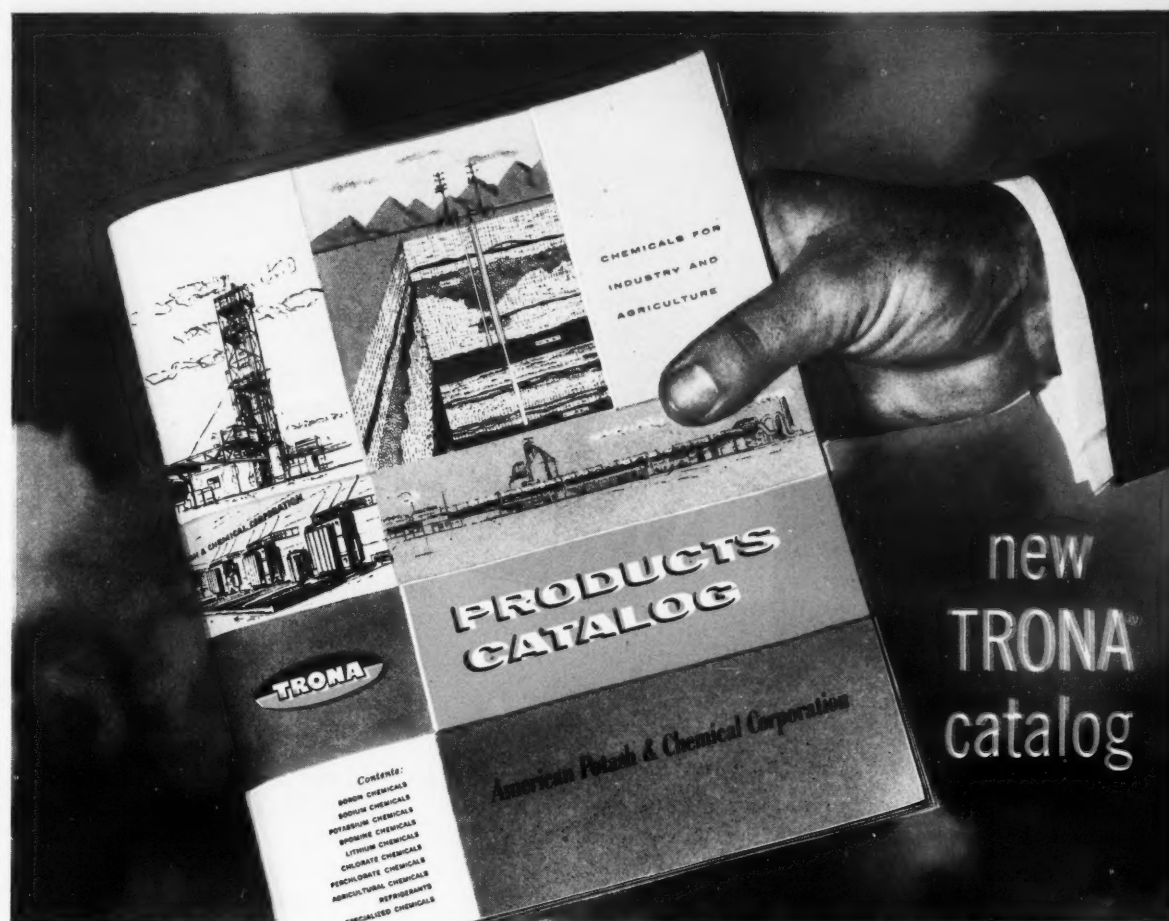
The type of glass fiber reinforcement is undergoing change. Because of cost squeezes, woven rovings and heavy needled mats are becoming more popular. Improvements in glass finishes allow better moldings which resist washings and hold up better. Improved uniformity of mats helps maintain quality of finished moldings.

The future will see the use of laminates made of several materials in order to utilize the best characteristics of each.

Fillers — the newly developed thixotropic fillers allow a molder to increase the viscosity of his resin without altering final properties. Molding procedures are improved by addition of 2-5% agent to the resin. Surface-coated fillers now are being introduced. This field is wide open for development, and the day will soon come when the coating can be tailor-made for each particular polymer, thus giving maximum benefit for the particle size of the filler.

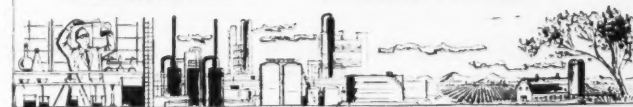
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CHEMICAL MATERIALS

Reinforced Plastics

(Continued from preceding page)

Powdered metals are used as fillers with the epoxides, while graphite is used in electrically conducting plastics, such as those used for low-temp heating elements. Finely powdered abrasives (Al or SiC) are used as surface films or fillers throughout the bodies of plastic tools. In addition to wood flour which is in common use, bark flour is finding acceptance.

The choice of the right filler is important to obtaining the proper balance between handling, moldability, and uniformity of premix flow and levels of filler loading. The particle size and shape and resin absorption of fillers must be considered in making a choice.



Session was well attended. Querying panel is Dr. Sergio Antiochia of Montecatini Soc. Gen., Milan, Italy, who is standing

Core materials — These are the thick bases for laminates, as contrasted to the facing materials. Honeycombs of aluminum, glass, or paper are popular. So are cores of high density balsa.

Foams are of increasing importance. Both rigid and flexible urethanes do not require adhesives, have controllable cell structure, and can be poured, sprayed, or extruded. Phenolic foams can be made either by blowing agents or by binding Microballoons. These Microballoon structures are called syntactic foams, and have densities as low as 7 to 10 lb/cu ft.

Polystyrene beads can be used. These foam on heating, or the pre-expanded beads can be used. They are especially good at low temperatures and where low moisture absorption is wanted. However they have a low heat distortion point, are flammable, and dissolve in many solvents, even those used in some adhesives. This means that these foams must often be sized.

Cellulose acetate may be continuously foamed by flash evaporation of solvent. This foam has a useful range from -70° to 350°F. Density is from 6

to 8 lb/cu ft. Disadvantage is its high cost.

Vinyl foams are popular in the automotive industry. They are heat-sealable. The plasticizer sometimes bleeds out, though, leaving a rigid material. Silicone foams are stable to 700°F for more than 20 hours. Their high price marks them only for special uses.

Some attention is being paid mineral foams, such as foamed glass and cement. Interest centers in their use as heat insulators and in fire proofing. Continuous filaments are being investigated for their bulking properties.

Prepreg molding materials — As prepreg molding materials permit the industry to substitute mechanization instead of hand layup operations, the materials are seeing increased popularity, especially as labor costs rise. As prepreps — rolls of continuous sheet or web-type reinforcement impregnated with resin — become more popular, more attention and research is being devoted to molding methods, allowing more control in manufacturing, and giving higher quality end products, which in turn extends the markets for reinforced plastic products.

The most popular reinforcing material is glass fiber, but non-glass reinforcements are gaining: *ie*, nylon is being used in non-metallic armor. Dynel, of superior chemical resistance, should prove of value in making corrosion-resistant containers. Asbestos fiber offers high-temp advantages. Reinforcement of synthetics with thermoplasts will give laminates which can be postformed under heat.

Again, polyesters are the most important resin, with diallylphthalate-modified polyesters a close second. The epoxies, phenolics, and silicones are finding wider uses. Others are being studied.

Conclusion — New developments, coupled with increasing economic advantages, are the reasons behind the prediction of even a brighter future for reinforced plastics. Their ever growing acceptance in the automotive, aircraft, boating, and building industries attests to this. Add the increasing uses in appliances, industry, and electrical and sporting goods — and you have a mushrooming industry. ■

Why the large page size
for this magazine?

CP Art Editor Harley Lichtenberger tells how this expanse of "editorial acreage" benefits you, the CHEMICAL PROCESSING reader.

... on page 213

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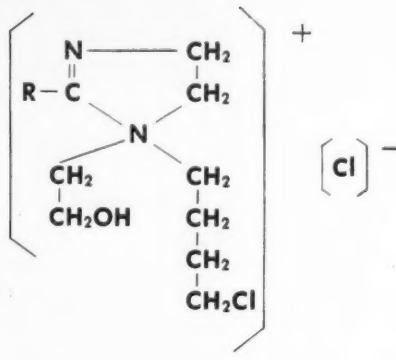
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MATERIALS

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adding 1-2% eliminates
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Uses: To improve flowability and eliminate brushmarks in gloss, semi-gloss, and flat paints.

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Description: A surface-active agent, material contains no resins or materials that will adversely affect paint or film. It improves durability and flexibility of the paint. An opaque, flowy paste, it does not need to be ground into the paint, but is added at the level of 1-2%.

(Raybo 15 is a product of Raybo Chemical Co., Dept. CP, Huntington, W. Va. . . or for more information check 3242 on convenient Reader Service slip which is located opposite last page.)

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(T-9278 is product of Micarta Div., Westinghouse Electric Corp., Dept. CP, Trafford, Pa. . . or for more information about manufacturer's product reader may simply check 3243 on form which is located opposite last page.)



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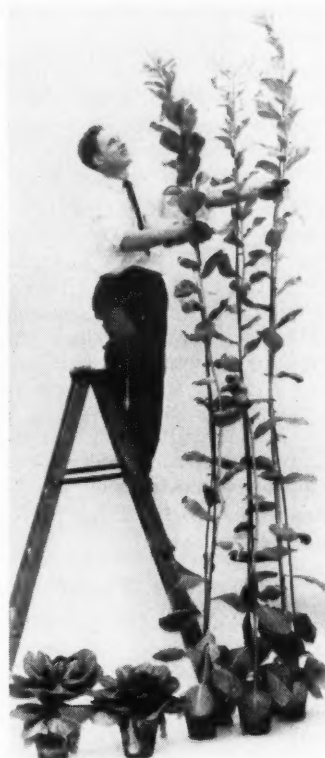
CHEMICAL WORKS

Box 100, 65 Destrehan St., St. Louis 7, Mo.

MATERIALS

Frankenstein's cabbages?

The stem tip of each of the three cabbages to the right were given a 100 microgram application of gibberellin once a week over a two month period. The two on the left are untreated plants of the same age.



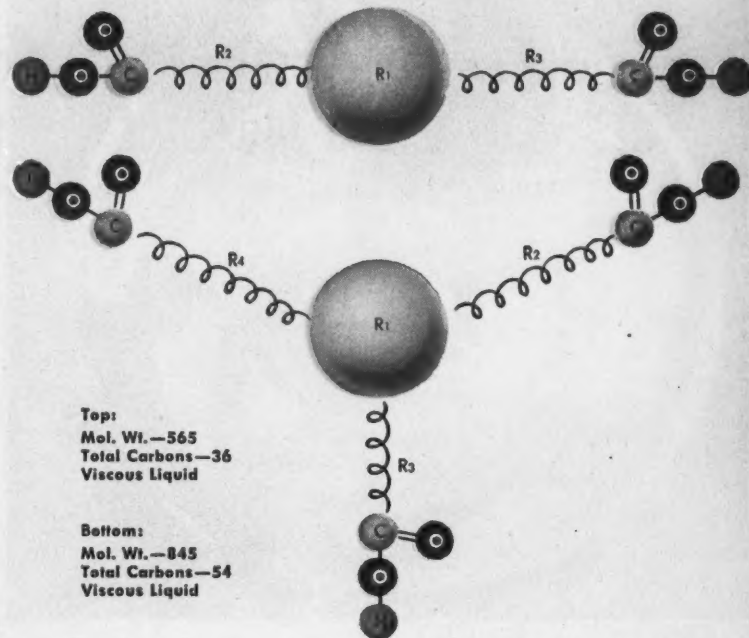
Dr. S. H. Wittwer of Michigan State is on the step ladder, checking the 12 foot, 5 month old plants, in a continuing investigation of gibberellin.

This plant growth regulatory substance is now available in bulk quantities and should be of high interest to plant and seed growers and others in the agricultural field.

(Gibberellin is a product of Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. ... or for more information check 3247 on form opposite last page.)

(Low concentration powder, suitable for application, is called Brel-in and is available from S. B. Penick & Co., Dept. CP, 50 Church St., New York 8, N.Y. Check 3248 on form opposite last page.)

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CHEMICAL ENGINEERING

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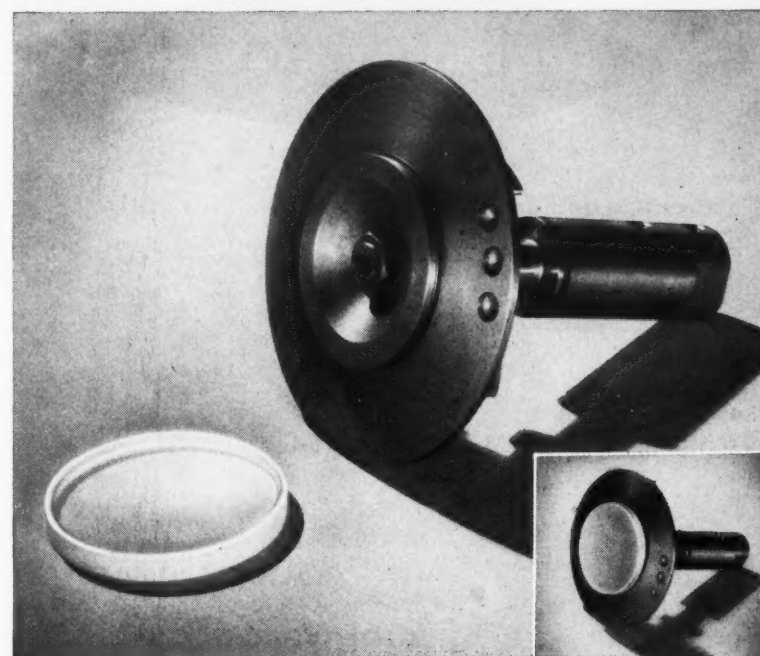
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Gives information about high purity MgO

Six-page folder tells about 99.0% magnesium oxide which is finding increased use in uranium ore treatment, electrical insulation, refractories, acid neutralization, curing agent for rubber, and in inexpensive reagent chemicals. Chemical and use data are given.

"99.0% Magnesium Oxide" is issued by Potash Div., International Minerals & Chemical Corp., Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. When inquiring check 3259 on form opposite last page.



Thanks to F. J. Slawek, Wyeth Laboratories, Inc., West Chester, Pa.

Mono Oleates Di

of
Diglycol

Ethylene Glycol

Diethylene Glycol

Polyethylene Glycol

Propylene Glycol

Polyoxyethylene

Butoxyethyl

Glycerine

MADE TO MEET YOUR SPECIFICATIONS



THE FLAME AND THE FLASK — SYMBOL OF QUALITY

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

5147 W. 67th Street, Chicago 38, Illinois

AKRON, OHIO • NEWARK, N. J.

CHICAGO, ILL. • LOS ANGELES, CAL.

When inquiring check 3260 opposite last page

CHEMICAL PROCESSING

MATERIALS

Four 'complexing agents' in laboratory quantities

Tetra sodium ethylenediamine tetraacetate is known for its property of forming stable, soluble compounds with practically every metallic ion. One gram of solution will chelate a minimum of 67 mg of calcium carbonate at pH 11.

Tetra potassium ethylenediamine tetraacetate, available for first time in laboratory quantities, is recommended for reactions where sodium ion would be undesirable.

Ethylenediamine tetraacetic acid is an effective agent for inactivation of polyvalent metal ions. It is also widely used as raw material for preparation of various derivatives including metal chelates, salts, and esters.

Calcium disodium ethylenediamine tetraacetate is used in drug and pharmaceutical industries as a stabilizer. Its most dramatic application is in treatment of lead poisoning in man and animals.

(Compounds are supplied in lab quantities, in approximately 25% concentration, by Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. Check 3261 on form opposite last page.)

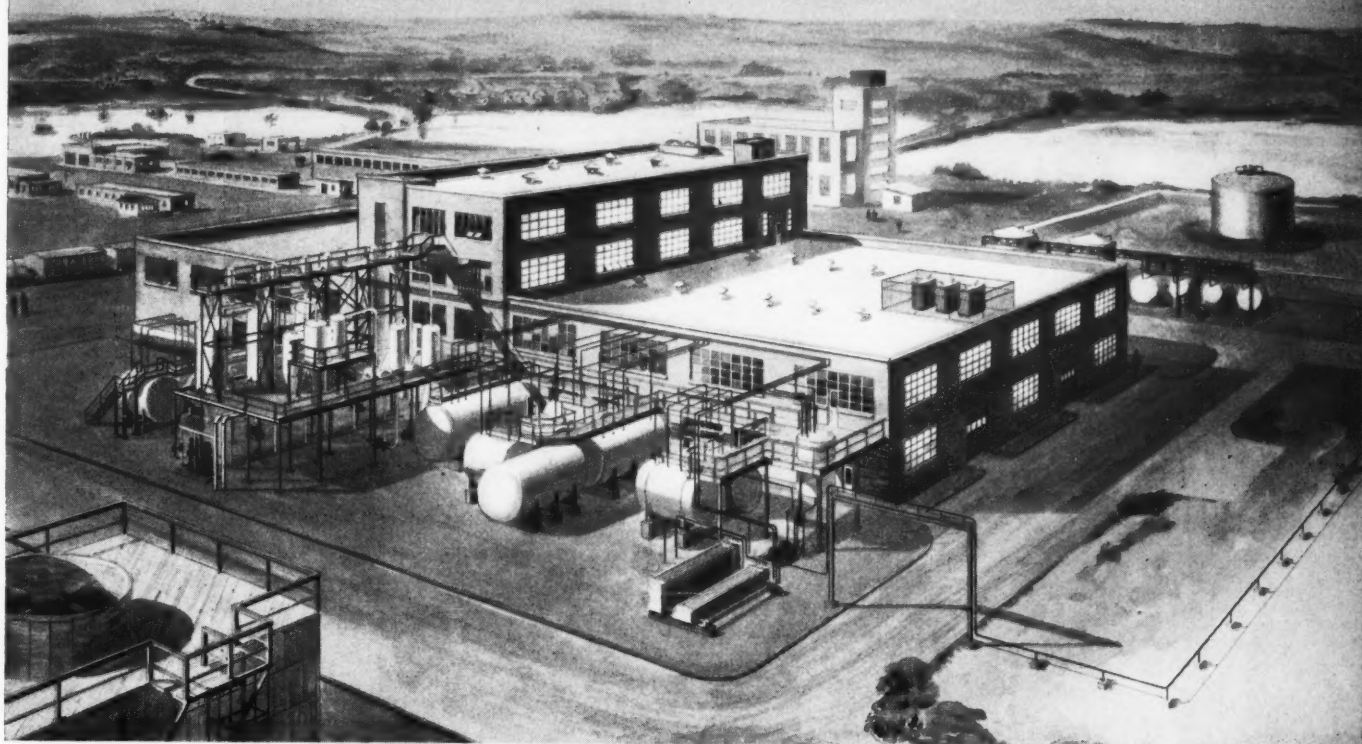
Tells how peracetic acid is used for sterilizing

How peracetic acid in aerosol spray is used for sterilization of space and equipment is discussed in eight-page bulletin. Its use by Lobund Institute of University of Notre Dame is described in detail.

Bul 83 is issued by Becco Chemical Div., Food Machinery and Chemical Corp., Station B, Buffalo, N.Y. When inquiring specify 3262 on form opposite last page.

For more information on product at right, specify 3263 . . . see information request blank opposite last page.

A PROGRESS REPORT...



Architect's drawing of new pentaerythritol plant at Fords, N.J.

more

PENTEK®

to meet industry's growing demands

A new plant—with an annual capacity of 25,000,000 pounds—will be on stream this summer—turning out Heyden Newport's full line of Pentek® brand pentaerythritols.

This marks the fourth major expansion of its pentaerythritol manufacturing facilities since Heyden developed the first commercial production of Pentek some twenty years ago. It maintains Heyden Newport's position as the world's leading producer of this versatile polyol.

...

A major producer of organic chemicals for a wide diversity of fields, Heyden Newport assures you of a dependable source of quality products meeting modern industries' most exacting requirements.

Our sales and technical staffs are at your service—convenient distribution points make stocks readily available to you.

Heyden Newport divisions serving the process industries:

NEWPORT INDUSTRIES COMPANY
producers of naval stores, tall oil fatty acids, and fine chemicals derived from wood.



NUODEX PRODUCTS COMPANY
manufacturers of additives and special purpose chemicals for paints, plastics, textiles, paper and metal plating industries.



**HEYDEN NEWPORT
CHEMICAL CORPORATION**

342 Madison Avenue—New York 17, New York



Ability to breathe so that trapped moisture is allowed to escape is advantage of water-base, vinyl-resin emulsion coating. Plastic coating — now available in several colors — resists chemical fumes and weather, providing . . .

PROBLEM: Method

used in the past in some of National Aniline plants for protecting insulation — consisting of wrapping it with roofing paper — was expensive, considering both materials cost and labor. In addition, completed job did not have a favorable appearance. Consequently, when a new chemical plant was being planned at Hopewell, Va., a procedure for protecting insulation was sought that would be more economical and present an attractive appearance when finished.

Solution: When the chemical plant was being constructed at Hopewell in 1954, a plasticized water-base polymerized vinyl-resin emulsion coating, available in colors, was used to protect all insulation in the plant. For example, distillation column was insulated with Kaylo and Fiberglas, then covered with canvas. Two coats of the plastic coating, known as Insulcolor, were then brushed on for a total film thickness of 10 mils or more. In refrigeration area, where temperatures of 0-5°F are required, cork was used as the base insulation, which was then covered with canvas and the plastic coating, applied as described.

Plastic coating has the ability to breathe — it is waterproof, yet will bleed moisture outward. This means that it will dry satisfactorily even though

◀ Attractive appearance of plant is enhanced by plastic coating on insulation covering distillation unit for cyclohexanone

ECONOMICAL PROTECTION TO INSULATION

GORDON WEYERMULLER, Associate Editor
With **GEORGE KILGO**, Engineering Department
Chesterfield Plant, National Aniline Division
Allied Chemical & Dye Corporation, Hopewell, Va.

applied in damp weather. Some other types of coatings would seal in moisture and lower insulation values.

Fact that coating is a water-based product is also an advantage. Hazard of flammable solvents is not present. Coating can easily be cut back with water rather than mineral spirits. It can be applied over a black asphaltic surface without bleeding through. Temperatures up to 160°F can be withstood without coating shrinking, cracking, or crazing.

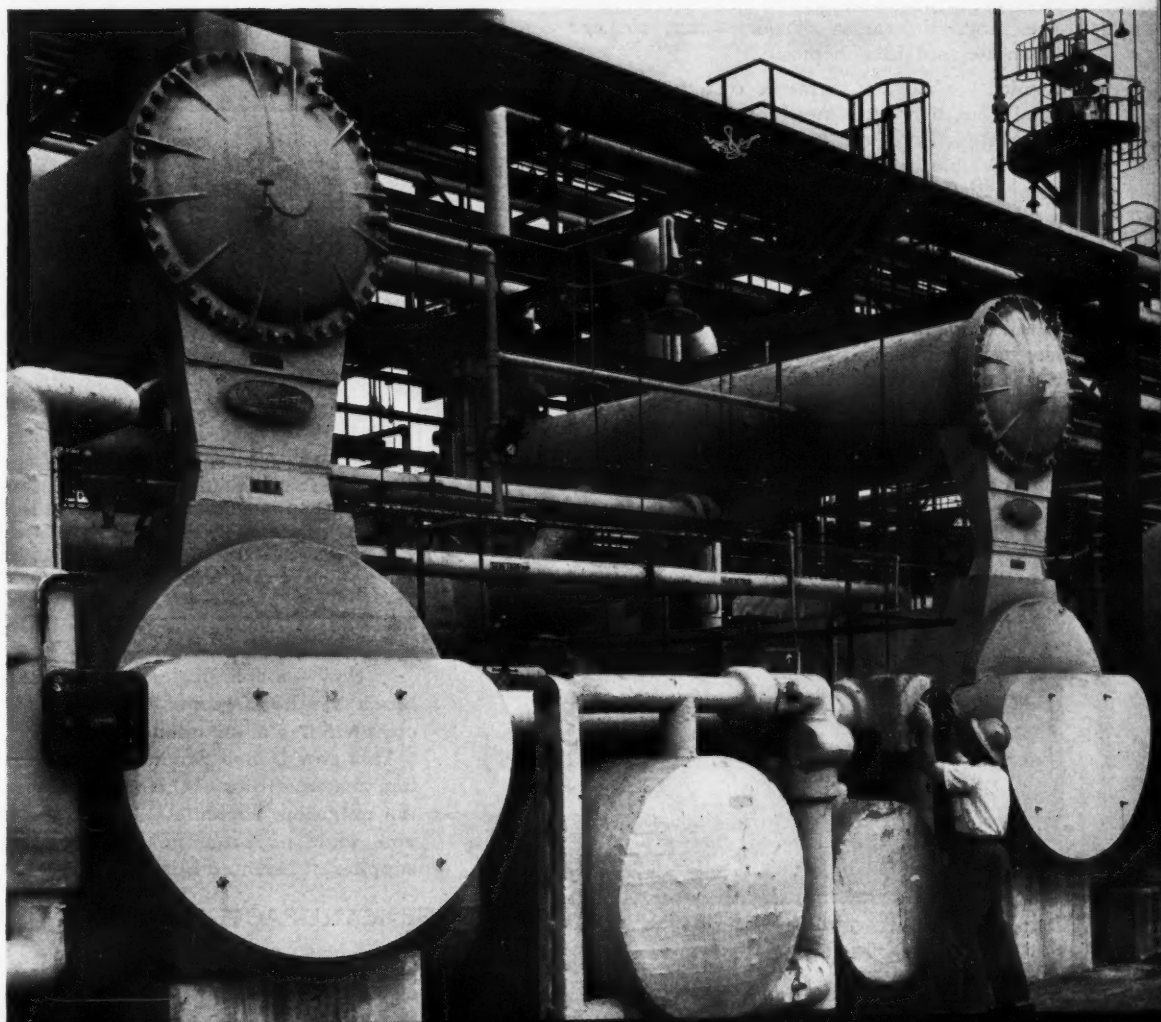
Coating is available in dark blue, light blue, dark green, light green, yellow, buff, and white. At National Aniline, white is predominant color used on most of insulation. Yellow is used for vessels storing hazardous chemicals. Other colors are used on product lines for identification.

In addition to insulation already mentioned, plant uses a material composed of granulated cork and rubber for insulating irregular surfaces on cold lines, such as valves and fittings. This material, known as Plasticork, can be easily molded around fitting by hand. Canvas is then wrapped around insulation and the vinyl plastic coating applied to exterior.

At the National Aniline plant where the plastic coating is used, caprolactam monomer is made. This serves as the raw material for Caprolan (Allied

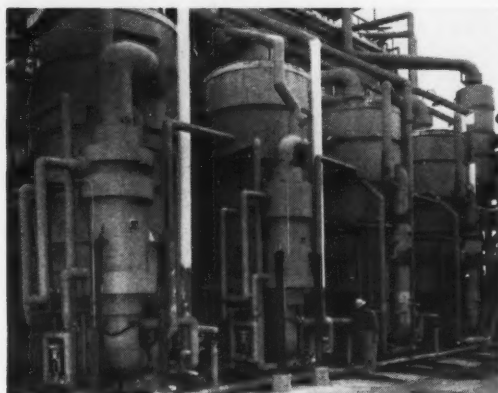
(Please turn to next page)

Refrigeration unit uses cork as insulation, which is vapor-sealed, then covered with canvas and plastic



Insulation Protection

(Continued from preceding page)



Evaporation units are protected by plastic coating

Chemical's polyamide fiber) which is made at another National Aniline plant nearby. In making caprolactam monomer, phenol and synthesis gas containing hydrogen serve as raw materials in initial step. Ammonia, carbon dioxide, sulfur, air, and oleum are used later in process.

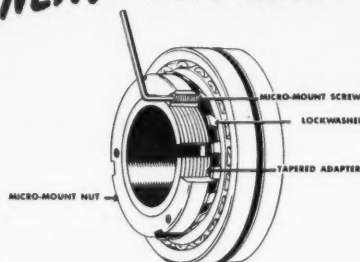
Results: Vinyl resin plastic coating is still in good condition after nearly two years service, providing economical protection to the insulation. Combination of weather and chemicals has been satisfactorily resisted. Colors have shown good durability. Another advantage of the coating is the attractive appearance it gives to the plant. Granulated cork and rubber insulation material has been handy to use around the plant.

(Insulcolor protective coating, cork insulation for low temperatures, and Plasticork moldable insulation are products of Armstrong Cork Company, Dept. CP, Lancaster, Pa. . . . or for more information check 3264 on form opposite last page.)



Cork and rubber insulating material is used on cold lines with irregular surfaces

NEW! MICRO-MOUNT



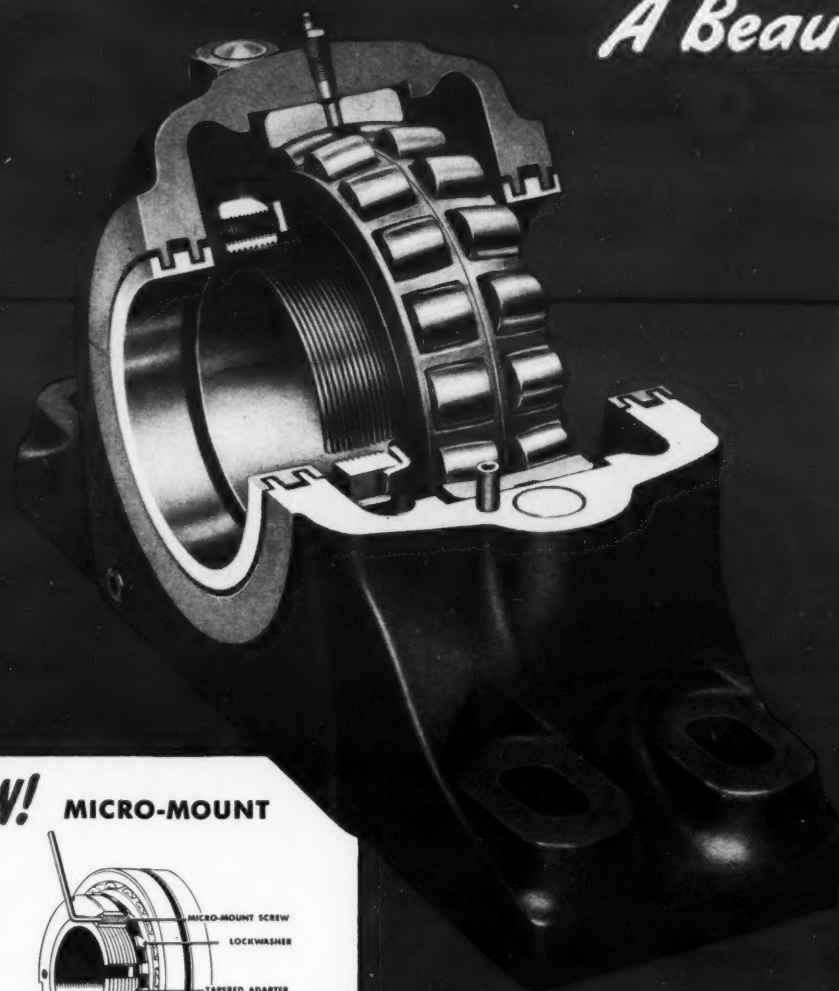
Fast and accurate mounting is made possible by the new Dodge Micro-Mount. The Adapter is snugged up with the Micro-Mount Nut. Mounting is completed by turning the Micro-Mount Screws against the Lockwasher until bearing, adapter and shaft form an integral unit.

Now — a spherical roller bearing pillow block has been added to "America's most complete line of mounted bearings."

This new Dodge product possesses all the fine characteristics of the spherical type, plus the precision, dependability and refinements you would expect from the nation's leading supplier of mounted bearings.

DODGE MANUFACTURING CORPORATION • 6200 UNION ST., MISHAWAKA, INDIA

A Beautiful



Rugged housing of close-grained semisteel, in compact modern design, withstands shock loads. The new Micro-Mount Adapter seats Spher-Align solidly on shaft, with amazing ease and speed. A new feature of bearing design allows lubricant to enter at center of bearing and move outwardly along all bearing surfaces. Convenient drain plugs permit use of either grease or oil and provide for easy flushing. Triple seals retain lubricant.

Standardized dimensions make Spher-Align interchangeable with all other similar units. Available in expansion and non-expansion types. In stock for 2 1/4" to 8" shafts. Call your Dodge Transmissioneer — or write us.

tiful New Bearing by Dodge —

Spher-Align

ANNOUNCING AMERICA'S NEWEST
SPHERICAL ROLLER BEARING PILLOW BLOCK
...A RUGGED BEARING IN ATTRACTIVE MODERN
DESIGN... INHERENTLY SELF-ALIGNING... EASY
TO INSTALL... EASY TO MAINTAIN... AND
FEATURING THE UNIQUE MICRO-MOUNT ADAPTER

AMERICA'S MOST COMPLETE LINE OF MOUNTED BEARINGS



DODGE-TIMKEN
Tapered Roller



SPHER-ALIGN
Spherical Roller



SC, SCM, SL
Ball



SLEEVOIL
Precision Ring Oiling



BRONZOIL
Capillary Oiling



BABBITTED
Solid and Split

PILLOW BLOCKS • HANGER BEARINGS
FLANGE BEARINGS • UNIT MOUNTS • TAKE-UPS

DODGE

of Mishawaka, Ind.



CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your telephone directory — or write us.

When inquiring check 3265 opposite last page

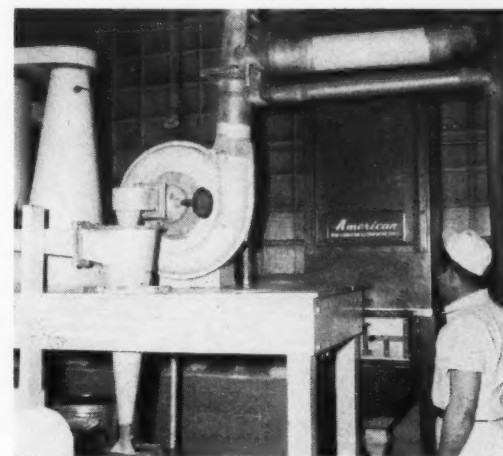
NEW SOLUTIONS of processing problems

Boost spray dryer yield with dust collector . . .

recovers product worth several hundred dollars a pound

Problem: Quantities of the antibiotic, Bacitracin, were being lost in the spray dryer exhaust at the Commercial Solvents Corp., Terre Haute, Indiana. The escaping material, worth several hundred dollars a pound, amounted to about 5% of that charged to the dryer.

Solution: A cloth-filter-type dust collector was installed to handle the dryer's exhaust air. Designed with Orlon filter tubes, unit withstands high temperature and moisture conditions. En-



Dust collector (right rear) recovers Bacitracin at Commercial Solvents Corporation. Part of spray dryer can be seen at left

trained drug collects inside tubes and is recovered during periodic shaking. Shaking cleans tubes, and the Bacitracin falls into a receiving container located beneath the tubes.

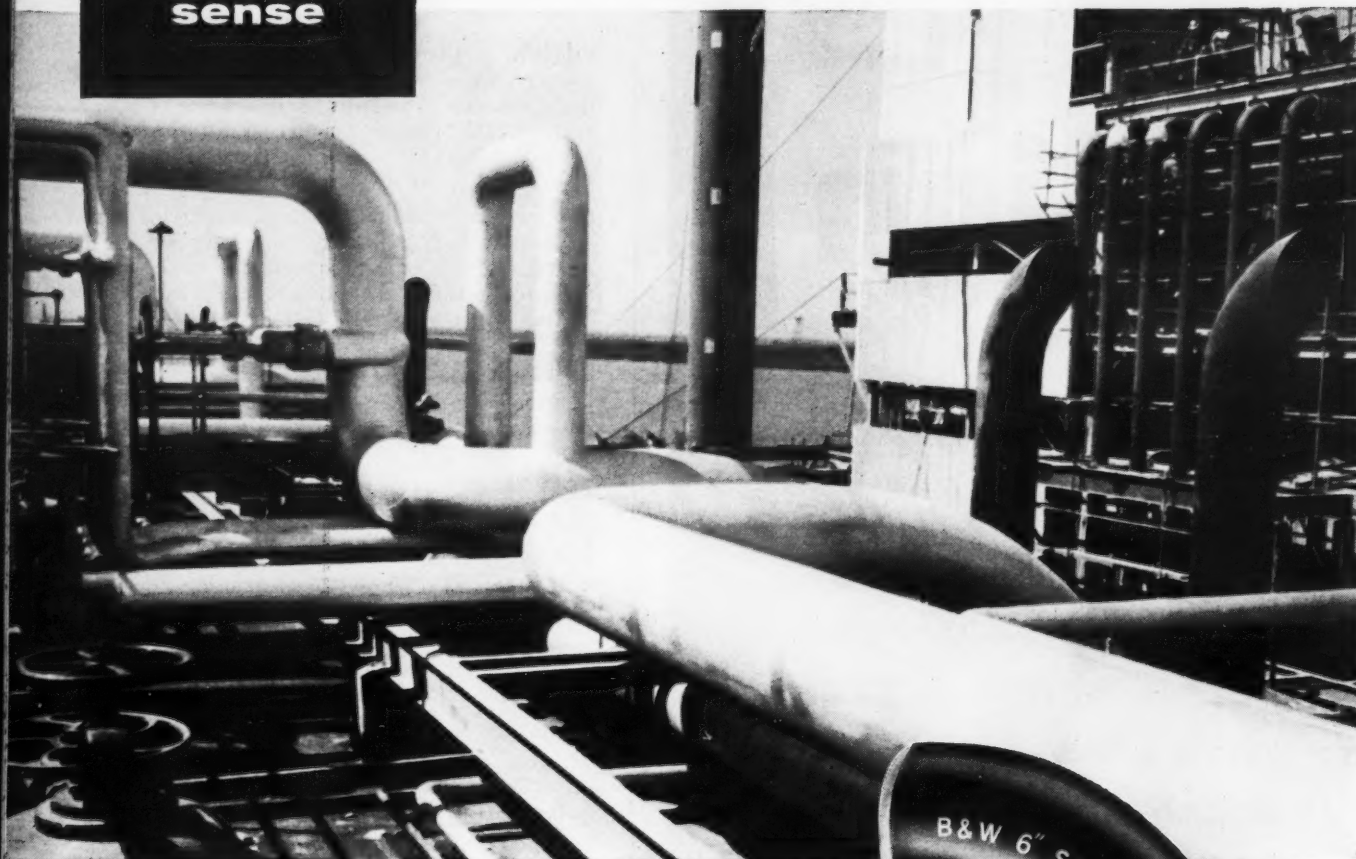
Results: Practically all of the antibiotic is now recovered rather than being wasted in the atmosphere.

(Orlon cloth filter-type dust collectors are manufactured by Wheelabrator Corporation, Dept. CP, Mishawaka, Indiana . . . or for more information reader may simply check 3266 on form which is located opposite last page.)

Quick means for determining addition of caustic soda in continuous-flow bleaching process in the paper industry is provided in the nomograph on page 242

**result of an
engineer's
good
common
sense**

**insulation is easier and
faster to apply when
seamless welding fittings are used**



THANKS to the engineer who specified B&W Seamless Welding Fittings, no humps or bumps had to be insulated here. Welding fittings became an actual part of this smooth, streamlined piping. And with a sound weld, welded connections are leak-proof, pipelines are permanent. Insulation never has to be restored because of leaky joints. Therefore, maintenance is practically non-existent.

Seamless Welding Fittings combine strength with lightness-in-weight and allow closer nesting. B&W's dimensional accuracy such as full radius, true circularity and smooth walls of uniform thickness permits uninterrupted flow even under highest temperatures and pressures.

Be sure — and specify B&W Seamless Welding Fittings and Forged Steel Flanges. They're available in a complete range of sizes and types in carbon steel and the B&W CROLOYS.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT
3839 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN

THE
NATURAL
SOURCE FOR
ALLOY
FITTINGS



FA-7906-FE-2

Seamless welding fittings and forged steel flanges, seamless and welded tubular products — in carbon, alloy and stainless steels.

NEW SOLUTIONS

Babbitt battles tramp iron in alkyl aryl sulfonate with magnetic trap

Problem: B. T. Babbitt, Inc., Albany, N.Y. had difficulty with tramp iron and scale in alkyl aryl sulfonate slurry used as a raw material for built detergents. Suction pump, used to unload tank cars of slurry, clogged and required excess maintenance.

Solution: Babbitt installed a three inch permanent magnetic



trap in tank car unloading line handling alkyl aryl sulfonate slurry. Trap consists of a stainless steel cylindrical casing with threaded fittings. Attached to a removable cover are multiple stainless rods, or "fingers". They are positioned so that flow of liquid brings pieces of iron within magnetic fields emanating from elements of Alnico V contained in each rod.

Results: Trap removes approximately ten pounds of tramp iron and scale from slurry each month. Suction pump performance has been greatly improved.

(Eriez 3" Model B Ferrotrap was supplied by Eriez Manufacturing Co., Dept. CP, Erie 6, Pa. . . or check 3267 opposite last page.)

For more information on product at left, specify 3268 . . . see information request blank opposite last page.

NEW SOLUTIONS of processing problems

Phone with electronic amplifier solves communication problem in noisy area . . .

unit has separate controls for adjusting volume of incoming and outgoing messages

Problem: High noise level in rectifier substation at US Industrial Chemicals Co., Division of National Distillers Products Corp., Ashtabula, Ohio, made it difficult for operator to transmit and receive telephone messages. Incoming messages were hard to make out and the oper-



CP Staff Photo

Unit looks and operates like a conventional phone

ator had to shout into the phone to make himself heard. Many times it was necessary to send written notes to the other party to insure accurate transmission of data. The substation supplies power to plant for electrolytic process of making sodium.

Solution: A telephone was installed equipped with an electronic amplifier. Unit looks and operates like a conventional phone and is connected into the existing telephone system. Power is supplied to the 3-tube amplifier through a cord that plugs into regular 110-volt, 60-cycle, AC outlet. Power consumption of unit is 12 watts. Total weight of phone is about 13 pounds.

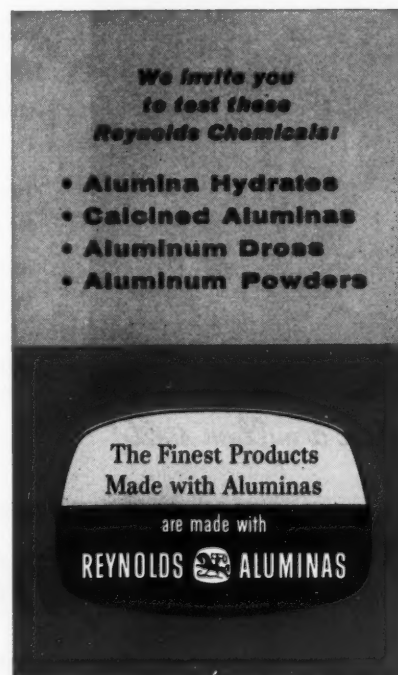
Unit is complete with separate controls for adjusting volume of incoming and outgoing messages and sidetone. Phones are available equipped for either dial or manual operation. They may be placed on desks, workbenches, or mounted on walls. Initial cost of unit is less than conventional telephone subset with sound-proof booth.

Results: Phone has been installed for over two years and has given satisfactory results.

(Gai-Phone is product of Gai-Tronics Corporation, a subsidiary of Gilbert Associates, Inc., and Stromberg-Carlson Company, a division of General Dynamics Corporation, Dept. CP, 100 Carlson Road, Rochester 3, New York . . . or for more information check 3269 on form opp. last page.)



Natural or Refined Aluminas? Measure the Difference in Dollars



When your production requires aluminas it pays to start with aluminas. You eliminate refining steps in your processing. And consider the advantages of product improvement through the use of pure high quality Reynolds Aluminum Chemicals, the savings in shipment and storage. Why add contaminants?

Reynolds production and control facilities are your assurance of constant, ample supplies of highest quality aluminum chemicals. For samples and complete information call the nearest Reynolds office listed under "Aluminum" in your classified telephone directory, or write Reynolds Metals Company, P.O. Box 1800-CO, Louisville 1, Kentucky.

REYNOLDS CHEMICALS

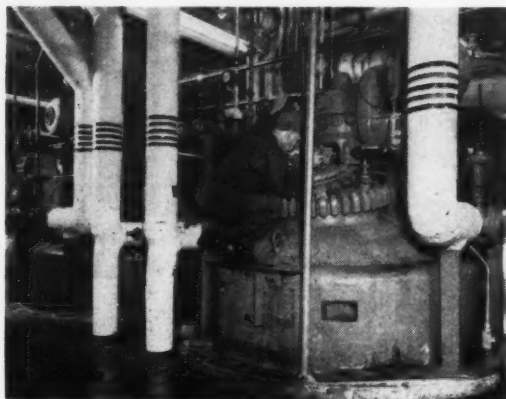
See "CIRCUS BOY", Reynolds dramatic series, Sundays on NBC-TV

When inquiring check 3270 opposite last page

**Help maintain sterile conditions
in drug processing by insulating
with cellular glass material . . .**

material is resistant to growth of bacteria and molds, unaffected by solvents

Problem: Production of ACTH, gamma globulin, insulin, and other drugs and pharmaceutical products manufactured from animal origin, at Armour Laboratories, Div. of Armour & Co., Kankakee, Illinois, requires absolute cleanliness in addition to close temperature control. Tons of animal tissues and organs comprise raw materials which



Process vessels have cellular glass insulation that holds critical temperatures, resists solvent spillage and fumes

must be stored and processed under sterile conditions, free from growth of harmful molds or bacteria. In some processes, allowable temperature differential is only one-half of one degree. Many products are processed under refrigerated conditions. In a number of operations solvent extraction is used. All of these conditions made the choice of insulating materials of prime importance.

Solution: When plant was constructed in 1953, buildings, piping systems, processing tanks, and refrigerated storage and processing rooms, were insulated with a cellular glass insulating material.

Special 45 and 23°F cold rooms, where human blood is fractionated and processed into gamma globulin and serum albumin, were completely lined — walls, floor, and ceiling. Two story freezer room, where animal glands are stored at 12 to 20°F below zero, was also completely insulated with cellular glass.

Most of the 70 reaction vessels in which hormones and enzymes are extracted, from animal organs through use of various solvents, as well as coolers for propylene glycol refrigerant and accessory piping and valves, were insulated with the cellular glass material. Material was cut to fit different shaped flanges, valve bodies, piping, and tanks.

Entire roof of plant, covering 175,000 sq ft, was insulated with two-inch thick blocks applied di-

Here's why your best steam trap buy is Yarway Impulse

THERE'S A YARWAY IMPULSE STEAM TRAP FOR EACH OF THESE REQUIREMENTS

As shown opposite, no matter what your need—normal loads, high capacity, low capacity, high pressure, low pressure—Yarway has an *impulse* trap to meet it.

GETS EQUIPMENT HOT FAST—KEEPS IT HOT

Yarway pioneered the application to steam traps of the principle of thermodynamics that makes possible quick heat-up, and high, steady temperatures. Result—peak efficiency from equipment.

ONLY ONE MOVING PART

A little valve is the only moving part. Nothing could be simpler.

LOW MAINTENANCE

Design and material make Yarway Impulse Traps practically trouble-free. A handful of spare parts will service a plant-full of traps.

SMALL SIZE . . . LIGHT WEIGHT

Fit in anywhere. Require no supports or special piping.

GOOD FOR ALL PRESSURES

No change of valve or seat for any pressure up to specified maximum.

NON-FREEZING

Great for outdoor installations. Won't freeze up, because condensate can't accumulate—there's nothing to freeze.

LOW COST

It often costs *less* to install a new Yarway Impulse Trap than to repair a conventional-type trap.

CONVENIENT SUPPLY

Over 270 Industrial Distributors stock and sell Yarway Impulse Steam Traps. One is near you.

NATION-WIDE SERVICE

34 trained Yarway field engineers, located in every corner of the country, give you quick, helpful steam trap service.

Want the free booklet "Banish Your Steam Trap Troubles" . . . or the Yarway Trap catalog? Write

YARNALL-WARING COMPANY

125 Mermaid Avenue, Philadelphia 18, Pa.

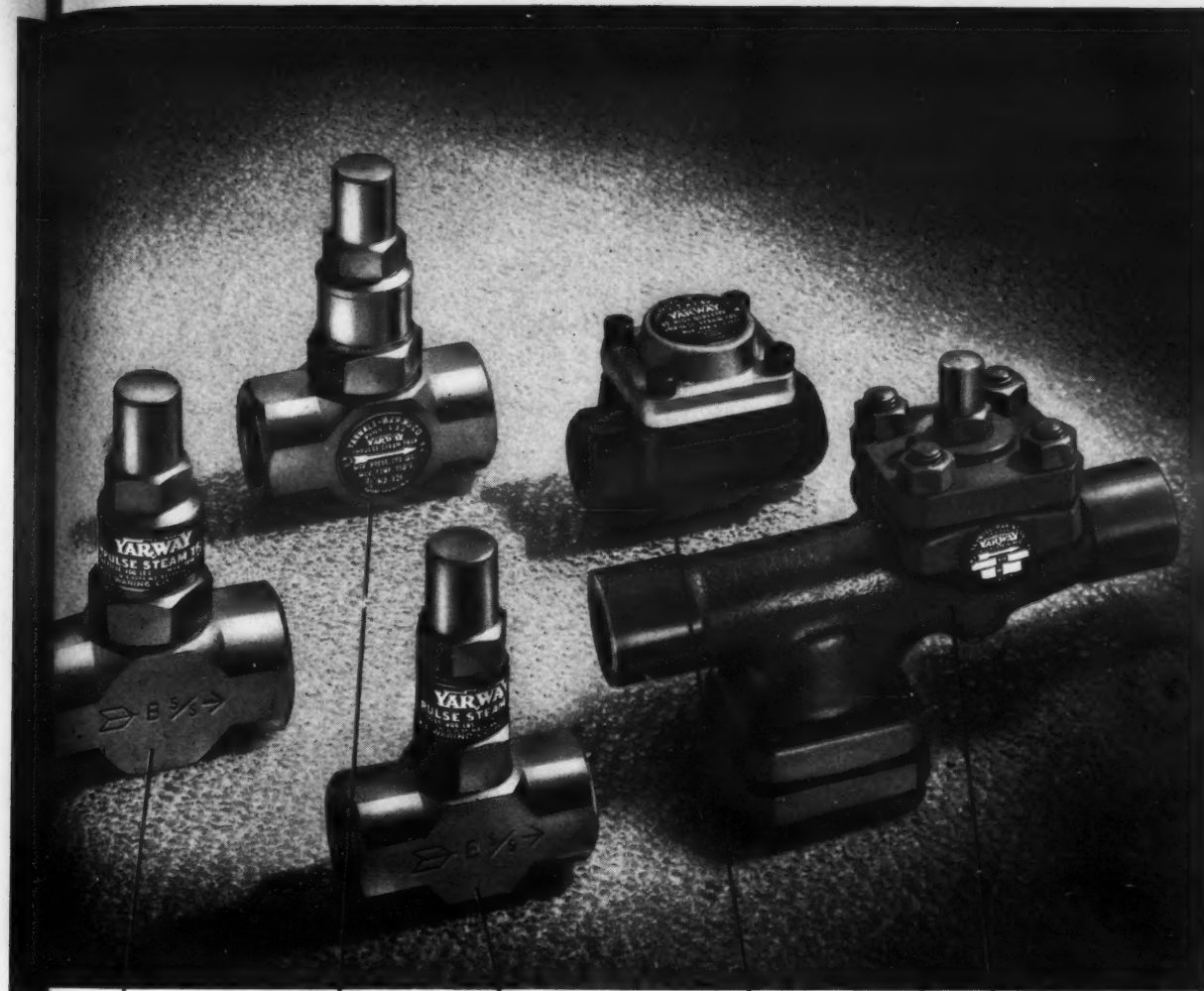


more than a million sold!

YARWAY

impulse

...a good



CHOOSE THE RIGHT IMPULSE STEAM TRAP FOR YOUR JOB

NORMAL REQUIREMENTS

Use Yarway Series 60 traps. All pressures to 400 psi and temperatures to 450°F. Six sizes ½" to 2".

HIGHER PRESSURES AND TEMPERATURES

Use Yarway Series 120 traps for pressures to 600 psi and temperatures to 750°F. Six sizes ½" to 2".

LIGHT LOADS

Use Yarway No. 20-A trap where condensate loads are especially light. (Available only in ½" size.)

HEAVY LOADS

Use Yarway Series 40 traps where condensate loads are especially heavy. Five sizes, ½" to 2½".

INTEGRAL STRAINER

For high pressure power plant trapping, also marine use, specify Yarway Integral Strainer Traps. Welding or flanged connections.



Although exposed to weather for more than three years, insulation has required only occasional painting

rectly to transite roof slabs with hot asphalt, and finished off with standard tar and gravel composition.

Results: Insulation will not support growth of molds or bacteria and helps maintain sterile conditions. All-glass composition makes material vermin-proof.

Temperatures in various cold and freezer rooms are economically maintained at proper level to assure preservation of physiological properties of animal raw materials and finished products. Insulation will not absorb moisture and therefore retains its insulating effectiveness under all conditions.

In processing, precise temperature differentials necessary in vessels and transfer piping are accurately held. Inorganic composition of insulating material is not affected by solvent spillage or solvent fumes.

Although much of piping and fittings are located outside, subject to all weather conditions, no maintenance has been required other than occasional painting. Lines can be relocated simply and easily, and insulation reapplied without damaging it.

(Foamglas insulation is a product of Pittsburgh Corning Corp., Dept. CP, Pittsburgh, Pa. . . . or for more information check 3272 on the convenient Reader Service slip which is located opposite last page.)

Why the large page size for this magazine?

CP Art Editor Harley Lichtenberger tells how this expanse of "editorial acreage" benefits you, the CHEMICAL PROCESSING reader.

... on page 213

way to specify steam traps

When inquiring check 3271 opposite last page



UNDERWRITERS and FACTORY MUTUAL APPROVED

"FIRE-FLEX" THE Modern FIRE HOSE

Stronger! Lighter! Longer Lengths!

The greatest advance in fire hose construction in over half a century . . . demonstrating an entirely new concept of fire hose weight, strength and flexibility, made possible by the use of new materials and methods of manufacture.

JACKET—A combination of high-tensile fibres of outstanding strength, woven by a special process, assuring highest resistance to pressure, wear, weather and rough handling. Size-for-size, "Fire-Flex" pressure-resistance is equal or superior to the heavier and stiffer conventional cotton jackets, despite its much lighter weight. The tightly woven fabric is virtually snagproof, and is treated to resist mildew.

LINING—A light-weight yet long-wearing reinforced rubber lining, bonded firmly to the surrounding jacket, and having a perfectly smooth waterway to insure a full, fast flow. In combination, the "Fire-Flex" jacket and lining provide a fire hose far ahead of conventional types in strength, flexibility, durability, ease of handling, and economy.

Available in Several Variations to Meet All Fire-Fighting Needs

Goodall Rubber Company Date _____
444 Whitehead Rd., Trenton 4, N.J.
Send complete information on the following "Fire-Flex" hose:
☐ "EZ flex" ☐ "SYN-FLEX"
☐ "LITE-FLEX" ☐ "DRI-RACK"
☐ Send representative with samples

Company _____
Address _____
City _____ Zone _____ State _____

COMPARE! Left: A 50 ft. coil of standard Cotton Rubber Lined, weighing 21 lbs. Right: A 100 ft. coil of "Fire-Flex", weighing only 19 lbs.



"EZ flex". The finest hose ever devised for municipal and industrial plant fire protection. Basic "Fire-Flex" construction—amazingly light and flexible, with more than sufficient strength to withstand the highest pressures involved in this broad field of fire-fighting service. Single and Double Jacket. Sizes 1 1/2" to 3". Max. lengths of 100 feet. Underwriters and Factory Mutual approved.

"LITE-FLEX". A new hose with all the outstanding characteristics of "Fire-Flex" construction, described at left, plus a gray latex-coated cover to meet the requirements of Oil Refineries, Chemical Plants and other installations where oils, chemicals, greases and other deteriorating agents are present. Less than half the weight of regular neoprene covered hose, it has a much higher burst pressure rating, and its flexibility far surpasses any other conventional fire hose.

The very thin, lightweight jacket combines high-tensile fibres by a special weaving process that provides exceptional strength, with highest resistance to pressure, wear and rough handling.

The latex cover assures long-lasting protection from chemicals, oils, greases and moisture penetration.

"Lite-Flex" is fully rubber lined . . . seamless, multiple-ply laminated, reinforced construction, with a smooth waterway to insure unrestricted flow. Single Jacket, Sizes 1 1/2" to 2 1/2", in maximum lengths of 100 feet.

"SYN-FLEX". The same stronger, lighter, more flexible "Fire-Flex" construction as above, but with black "Synplastic" instead of latex cover, for service requiring exceptionally high resistance to abrasion and/or chemicals. Single Jacket, Sizes 1 1/2" to 2 1/2".

"DRI-RACK". Used in place of Unlined Linen Hose for indoor protection wherever fire hose must be ready for reliable use after long periods of storage. Exceptionally light in weight and extremely flexible . . . folds into smaller space. No "weeping" while jacket is reaching maximum absorption, as with linen hose—all the water goes on the fire! The seamless, laminated, reinforced rubber lining is tough and durable, and will stay "alive" for years. SINGLE JACKET, Sizes 1 1/2" and 2 1/2". Max. lengths, 100 feet. Factory Mutual Approved.

Standard of Quality—Since 1870

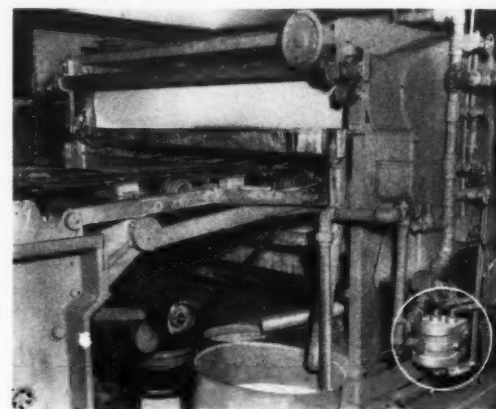
GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

Through use of hot spray paint heater . . .

Rheem reduces drum

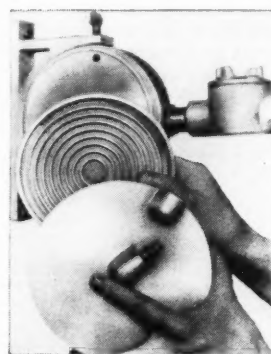
Problem: At the Houston plant of Rheem Manufacturing Company — where an average of 600 55-gal lithographed drums roll off a single line every hour — trouble was experienced to synchronizing finishing operation to line speed without excessive rejects. In the lithograph process



Paint passes through heater (encircled) and reaches a constant temperature before it is applied to sheets entering lithograph press

enamels and interior coatings are applied to flat sheets on a large printing press before sheets are formed into drums. Daily and seasonal temperature changes caused viscosity variations in coatings. Giant press is sensitive to variations in coating thickness which resulted — hence the rejects.

Also, when outside temperature was low, a drum of paint brought inside wouldn't feed into the press at all. Only after two or three days inside did drum reach usable temperature.



Paint passes through almost 7 1/2 feet of scroll within the heater. Heat transfer is extremely efficient

Solution: Two years ago a dual hot spray paint heater was installed in paint line feeding lithograph rollers. Enamel now passes through heater on its way to the press and reaches rollers at a constant temperature of 160°F.

When inquiring check 3273 opposite last page

duces drum rejects

Rheem
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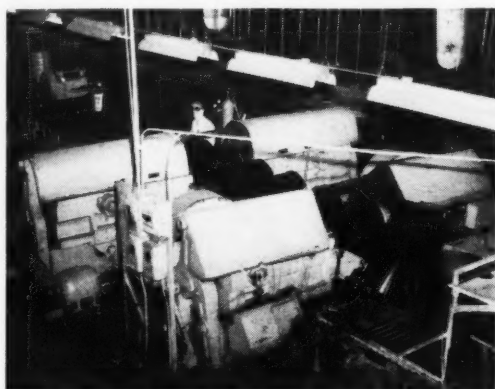
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160°F.

ESSING

Enamel now enters lithograph press at
constant temperature and viscosity

Heater employs a scroll, which is a separate piece that fits between coverplate and the electrical housing. A metal-to-metal fit forces paint to follow route of scroll — almost $7\frac{1}{2}$ feet of travel within the heater. This represents a large heat exchange area since the scroll, completely filled, holds only $1\frac{1}{2}$ ounces of paint.




Paint must be hard enough not to mar — yet pliable enough to withstand drum finishing operations

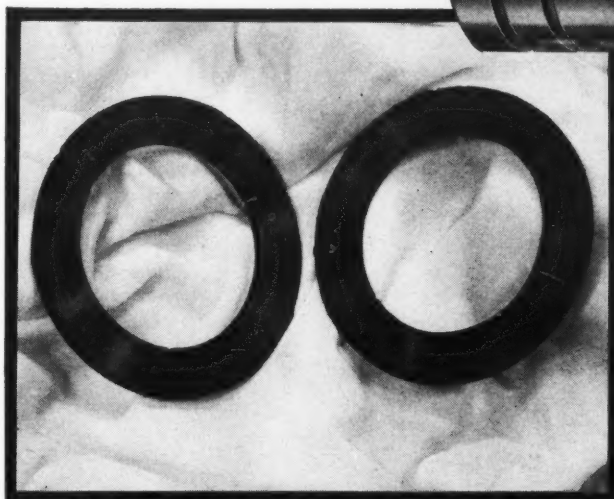
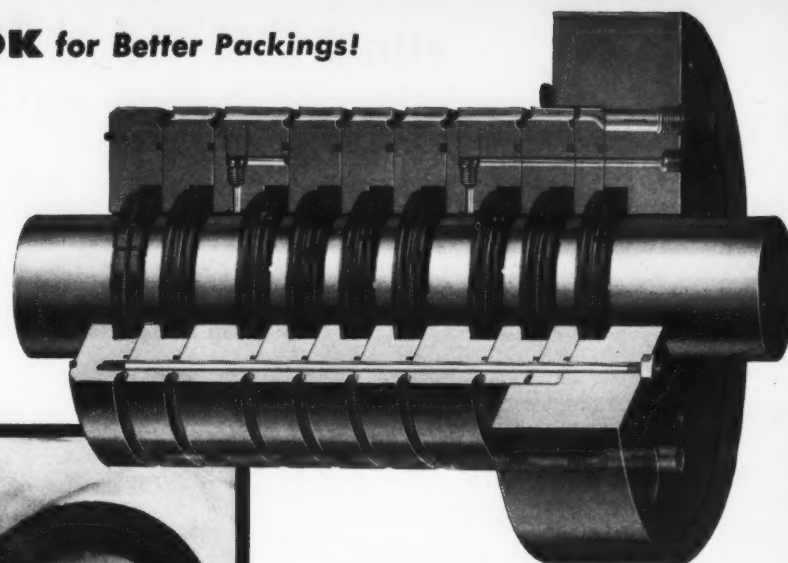
Heat comes from an electric element cast into the aluminum electrical housing. An adjustable thermostat controls temperature of unit. Heat fuse will disconnect heater in event thermostat should fail. Heater is UL approved as explosion-proof, Class I, Group D.

Results: Rejects at the Rheem plant have been cut to 0.3% through use of the paint heater. High quality finish has been maintained. Enamel is shock resistant — hard enough not to mar — but pliable enough to take roll forming, punching, and pressing of bungs in top.

Another added benefit obtained with the heater is that drums of paint can now be brought directly into finishing room from outdoors regardless of outside temperature. Cold enamel is quickly heated up and enters lithograph press at constant temperature and viscosity.

(Paint heater is product of The Spee-Flo Co., Dept. CP, 720 Polk St., Houston, Tex. . . . or for more information check 3274 on form opposite last page.)

 Look to **COOK** for Better Packings!



Above is a Cook design for high-pressure applications. Photo at left shows typical Cookmet bronze ring.

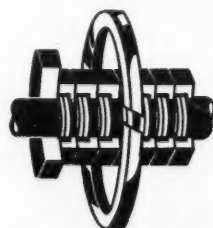
Cookmet Bronze Rings often worth their weight in gold!

HOW do you measure the value of packing rings that assure uninterrupted operation? Is it \$5 per ring . . . \$500 . . . or \$5000?

For high-pressure applications, you can't afford less than Cookmet bronze packing rings. Cookmet rings are made by an exclusive formula in Cook's

own foundry. They are precision-lapped to give a perfect seal when you need it most, at the start of your operation!

For recommendations about a Cookmet bronze solution to your high-pressure packing problems, write to C. Lee Cook Company, 932 South Eighth Street, Louisville, Kentucky.



**C. LEE
COOK
COMPANY**

A Subsidiary of Daver Corporation

Rings and Packings Since 1888

When inquiring check 3275 opposite last page

Eliminate costly enclosures with Allis-Chalmers weather-protected MOTORS

Modern features
cut operating, maintenance
expense... give
MORE dependability

Here's a newly designed line of Allis-Chalmers weather-protected motors with the ability to "take" outdoor conditions. This means no expensive protective enclosures are needed... a big saving in plant or installation building costs.

Designed to meet defined NEMA requirements, these motors incorporate many important features which assure dependable outdoor operation:

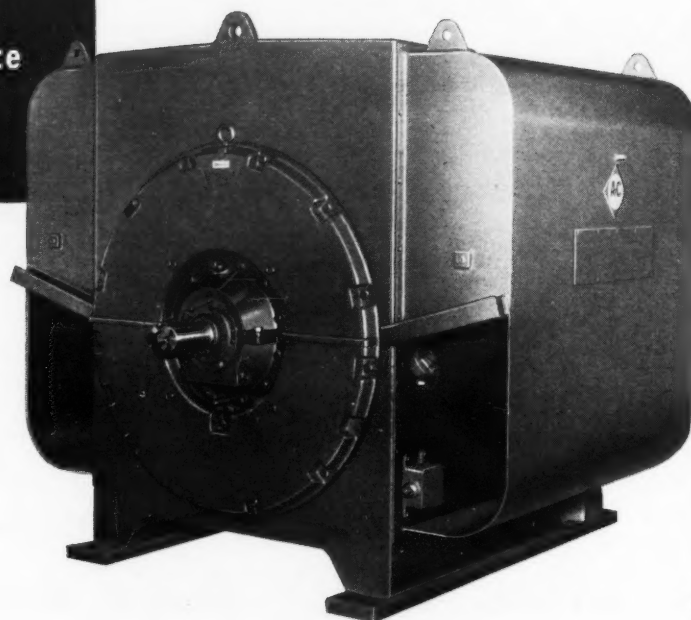
- **Ventilating System** — Low velocity intake, vertical lift, change of direction and high velocity discharge of ventilating air keep rain, snow, sleet, dust and dirt out of vital parts.
- **Removable Air Ducts** — To facilitate inspection and maintenance of interior air passages, air intake ducts are designed for quick removal.
- **Stator Assembly** — Removable as a unit, it simplifies maintenance and minimizes downtime.

Silco-Flex is an Allis-Chalmers trademark.



A-5292

ALLIS-CHALMERS



- **Split Sleeve Bearings** — Capsulized design permits access to motor interior without disturbing the bearings or their enclosures. Positive vapor seal is used on high-speed motors. Antifriction bearings are available for slow speed motors.

- **Proven Insulation** — Famous Allis-Chalmers insulation systems (Class A and B) are available. And, for extreme temperatures, or where high resistance to abrasion and moisture is required, Allis-Chalmers can provide the revolutionary *Silco-Flex* system.

THIS DESIGN available in ratings from 250 to 900 hp. Other designs in larger horsepower ratings are also available. Contact your A-C sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. Ask for Bulletins 51B8606A and 05B7894.

When inquiring check 3276 opposite last page

NEW SOLUTIONS of processing problems

Imparts "ideal" viscosity and body to silicone, resin, and wax furniture polish...

polish spreads out evenly without streaking, yet can be filled on high speed machinery

Problem: Turtle Wax-Plastone Products Co., Chicago, Illinois, makers of a famous auto polish, wanted to expand into the furniture polish field. However, they desired to market a polish that overcame the disadvantages of previous conventional polishes of the oil emulsion or solvent wax types.



Although finished polish is thick, flow through filler is fast, as thickener is non-Newtonian in character

This "ideal" polish, they reasoned, must have viscosity characteristics that prevented streaking under any application condition and also give excellent spreadability, even after prolonged storage. The polish had to give a crystal clear finish that was hard and resistant to alcohol and water. Moreover, this new polish must be of such character as to permit filling on Plastone's high speed automatic equipment.

Solution: About two years ago, Plastone came up with an aqueous emulsion of silicone, resin, and wax. The desired viscosity characteristics were obtained by introduction of a hydrophilic gel-forming gum called Carbopol 934 (see *CHEMICAL PROCESSING*, June 1954, p 22).

Making the polish is a two-step operation. Silicones, wax, resins, and solvents are blended in steam-jacketed kettles. Blend is emulsified under high speed

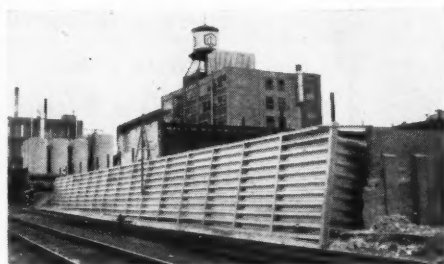
agitation with the water phase that contains Carbo-pol 934. After proper dispersion and viscosity are attained, emulsion is passed through a colloid mill and is then cooled before filling into the brightly colored containers.

Results: By controlling pH of formulation and accurate measurement of the Carbopol, the proper viscosity and body are obtained. This viscosity is non-Newtonian in character. This means that as the rate of shear increases, the viscosity of the polish thins down. This is important because the Turtle Wax bottles can now be filled on high-speed equipment, and yet when the polish is used, it is nice and creamy.

The thickener will not hydrolyze, nor will it be attacked by bacteria or fungi. Toxicity of thickener is negligible and there are no effects on the skin.

The final furniture polish is easy to apply and won't streak. It resists water and alcohol. The surface is crystal clear and dust repellent, and has the same coefficient of expansion as the wood finishes to which it is applied.

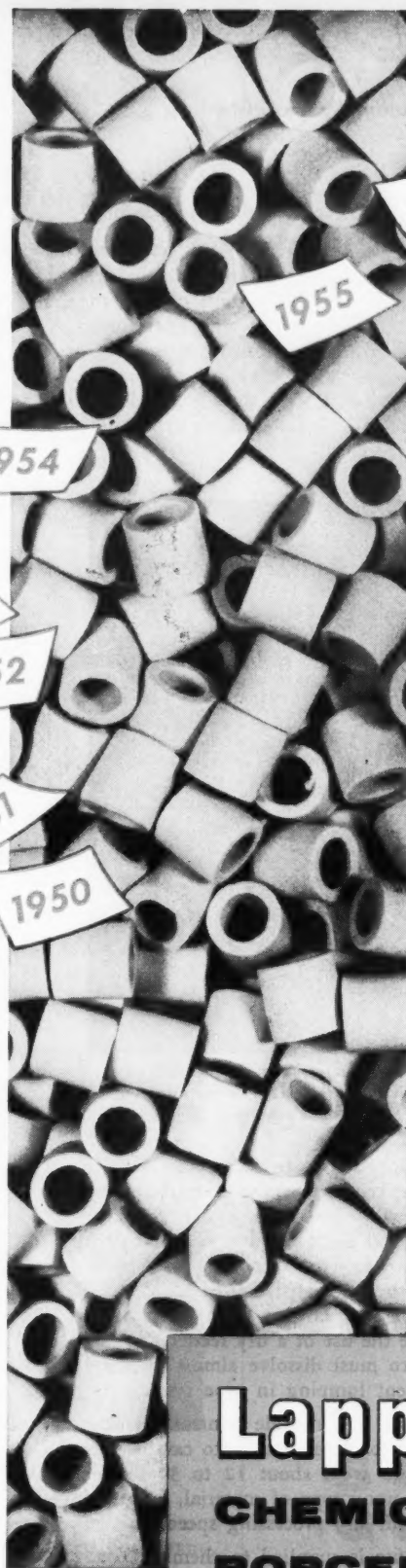
(Carbopol 934 is a product of B. F. Goodrich Chemical Co., a div. of The B. F. Goodrich Co., Dept. CP, 3135 Euclid Ave., Cleveland 15, Ohio . . . or for more information reader may simply check 3277 on the convenient Reader Service slip which is located opposite last page.)



Plant solves space problem with metal-wall bin

The Interchemical Corporation, Finishes Div., Cincinnati, Ohio, needed more space for storage tanks for industrial solvents. It was important that this be done without losing land area. It was decided to bury the additional tanks at rear of property, which is much lower than main area. To take full advantage of property limits, it was necessary to install a 160 ft long x 16 ft high metal bin-type retaining wall along railroad siding. No land was sacrificed and the ground above the buried tanks is still open for further industrial expansion.

(Metal bin-type wall is product of Armco Drainage and Metal Products, Inc., Dept. CP, Middletown, Ohio . . . or for more information check 3278 on form opposite last page.)



**LONGER
CONTINUOUS SERVICE**

...WITH LAPP PORCELAIN RASCHIG RINGS

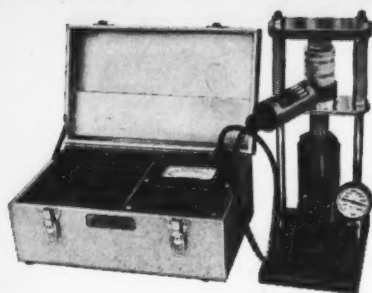
Lapp Porcelain Raschig Rings are your best bet for Process Tower packing for two important reasons . . . purity and strength. Lapp raschig rings are non-porous, completely vitrified and iron-free. They are chemically inert to acids of all concentrations (except hydrofluoric), will not crumble and will not absorb liquids which could later contaminate the product being processed.

As for strength, Lapp raschig rings are dense, hard and close-grained. They are tougher against damage from handling and tower operation than other ceramic rings or other packing shapes. Because Lapp rings are so strong and inert, they seldom need replacement. Hundreds of satisfied customers back up our claim of longer continuous service—with real savings. Get the full story on Lapp Chemical Porcelain—see for yourself how this initially low-cost material can save you money while providing a sounder processing system.

WRITE for our bulletin containing description and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 325 Wendell St., Le Roy, New York.

**Lapp
CHEMICAL
PORCELAIN**

When inquiring check 3279 opposite last page



Is improper moisture in your products...

...adding to operating expense?
☐ yes ☐ no

...slowing production for tests?
☐ yes ☐ no

...bringing customer complaints?
☐ yes ☐ no

Any yesses? Then it will pay you to find out how the Granular Moisture Register model G5, operating on high frequency power loss principal, will indicate moisture content quickly and dependably, help solve those problems with...1-minute tests on the spot!
•Practical Accuracy Guaranteed!
•No skilled technicians! •Two weeks free trial!

Most granular products
such as:

Ammonium Nitrate • Ammonium Sulphate
 • Toilet Soaps • Plastic Molding Compound
 • Polyvinyl Chloride • Ammonium Perchlorate
 • Sodium Bicarbonate • Polyethylene
 Resins

DOZENS MORE

MOISTURE REGISTER Instruments

Moisture Register Co., Dept. CPB
 P. O. Box 910, Alhambra, Calif.

☐ We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.

We will want to test _____

In a moisture range from _____ % to _____ %.

Firm Name _____

By _____ Title _____

Address _____

City _____ State _____

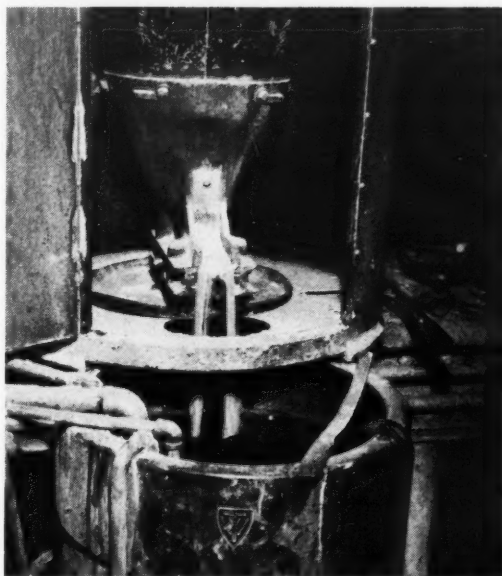
When inquiring check 3280
opposite last page

NEW SOLUTIONS of processing problems

Free-flowing sodium hydrosulfite added with chemical feeder at bleachery . . .

form of chemical and method of feeding save material, improve quality

At Standard Bleachery and Printing Company, Carlton Hill, N. J., the full strength of sodium hydrosulfite used in pad-steam dyeing operations is obtained by adding hydro to caustic at last possible instant before the caustic-hydro solution is fed into chemical pad. Not only does it save large quantities of hydro but it also leads to more consistent results.



Dry chemical feeder meters sodium hydrosulfite into caustic. Hydro must be free flowing to make the use of a dry feeder possible

At Standard Bleachery, where Swanwhite fabrics are processed, the reducing agent is made up by using a free flowing hydro in a dry chemical feeder. Feeders meter out exact amounts of hydro into caustic less than two seconds before solution is fed into the pad. Hydro used in such an operation must be free flowing even under high humidity to make the use of a dry feeder feasible. In addition, hydro must dissolve almost instantly in order to prevent lumping in pipe systems.

Speed of chemical pad mangle controls rate at which sodium hydrosulfite is fed into caustic. Actual amount varies from about 12 to 30 lb per hour, depending upon type of material, type and amount of dyestuff, and processing speed.

Sodium hydrosulfite is supplied to chemical feeder through a 250-lb storage bin. From here it is metered out into a ceramic mixing crock. Caustic soda solution under pressure enters crock along its inclined diameter, setting up centrifugal



Consumers are invariably guided by first impressions . . . and in plastic and rubber household goods, a repulsive odor can arouse displeasure—even before a product is used.

Fresh, clean fragrances . . . economically provided by RESODORS and PARADORS . . . sell and resell plastic and rubber products. Objectionable odors are gone and the customer's

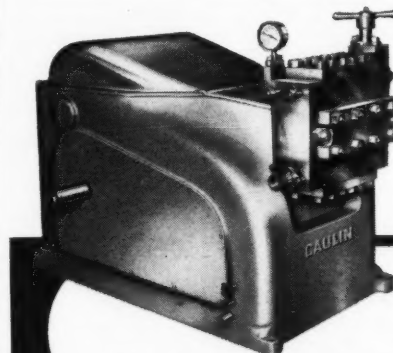
first encounter with your product is a pleasure.

Insure consumer acceptance with RESODOR and PARADOR fragrances. Several types are available, all residual, heat stable and harmless to tensile strength or color. Write Sindar, describing your product, for samples and technical service.

SINDAR Corporation
 Industrial Aromatics and Chemicals

330 West 42nd Street
 New York 36, N. Y.

When inquiring check 3281 opposite last page



**Pump,
Control, Move
Liquids, Slurries,
Viscous and
Abrasive Fluids**

with
**GAULIN
HIGH PRESSURE PUMPS**

These two special pumps can control and move a wide variety of materials.

Triplex Hi-Pressure Pumps handle large volume of all types and densities of fluids. Capacities to 6000 gph, pressures to 8000 psi, temperatures from -90°F to +550°F. Used for all types of product—sanitary, corrosive, abrasive, viscous and volatile—for transfer, metering, injection, testing and spray drying.

Gaulin HX—hydraulic pressure exchange pump—specially designed for extremely abrasive and corrosive muds, slurries and solutions. Slow cycle operation—no plungers, no packing pressures to 2000 psi, capacities to 120 gpm.

Ask for G.T.A. to help you select the right pump for your requirement . . . over 100 different models have been developed to handle all types of pumping problems.

G. T. A. . . . Means Gaulin Technical Assistance—best source on how to mix or move your product.

FREE! Send for the G.T.A. Library of Product Information.

Manton-Gaulin Manufacturing Co., Inc., 55 Garden Street, Everett 49, Mass.

When inquiring check 3282 opposite last page

CHEMICAL PROCESSING



1
if by
hand



2
if by machine

Alconox the world famous hospital and laboratory detergent now has a twin brother.

Whether you wash your delicate glassware, instruments and equipment by hand or by machine, we have the product that will do the job faster, better and safer than any detergent now on the market.

Paul Revere's message was dictated by the signal from Old North Church.

Your decision is dictated by the washing method your laboratory uses.

ALCONOX for all equipment washed by hand:

ALCOJET for all equipment washed by machine:

Alconox available in:	
Box of 3 lbs.—price	\$ 1.95
Carton (12 boxes of 3 lbs.)	18.00
Drum of 25 lbs.	lb. .45
Drum of 50 lbs.	lb. .40
Drum of 100 lbs.	lb. .40
Barrel of 300 lbs.	lb. .37
(slightly higher on West Coast)	

Alcojet available in:	
Box of 5 lbs.—	\$ 3.00
Case (6x5 lbs.)	15.00
Drum of 25 lbs.	lb. .45
Drum of 50 lbs.	lb. .42
Drum of 100 lbs.	lb. .40
Drum of 300 lbs.	lb. .37
(slightly higher west of the Rockies)	

Order from your favorite supplier
or write for literature and samples.

ALCONOX, Inc.
353 BROADWAY, NEW YORK 3, N.Y.

When inquiring check 3283
opposite last page

NEW SOLUTIONS of processing problems

motion and submitting hydro to a strong mixing action. Crock terminates in a 1½" stainless steel pipe that leads to gutters and pad.

It is estimated that the dry feed system provides 20% more usable strength from the hydro than is possible with older batch methods. Considerable strength can be lost while batch mixed liquor is in storage.

(Vatrolite sodium hydrosulfite is product of Royce Chemical Company, Dept. CP, Carlton Hill, N. J. . . . or for more information check 3284 on form opposite last page.)

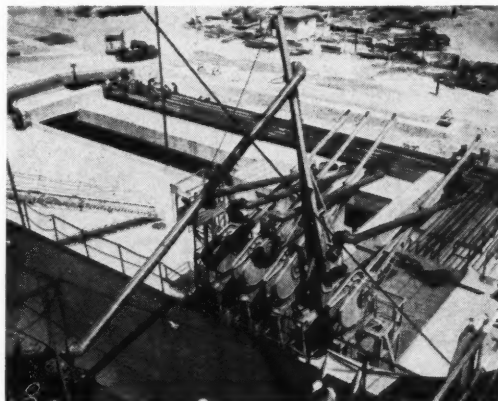
(Chemical feeder is product of Wallace & Tiernan Company, Dept. CP, 1 Main St., Belleville, N. J. . . . or check 3285 on form opposite last page.)

Less time, fewer men needed to transfer oil to tankers . . .

Richfield Oil has replaced rubber hoses with hydraulically operated metal loading arms

Problem: Time is money when loading a ship. Richfield Oil Corp. figures it costs around \$150 per hour to operate a tanker — and minutes of unproductive docktime add up over a period of time.

Richfield realized that loading fluid chemicals, oils, and gasoline at its Long Beach, Calif., terminal was a time- and expense-consuming dockside operation. It took approximately seven men — on ship and dockside — to wrestle an eight-inch rubber hose by means of overhead crane into proper position for loading or unloading.

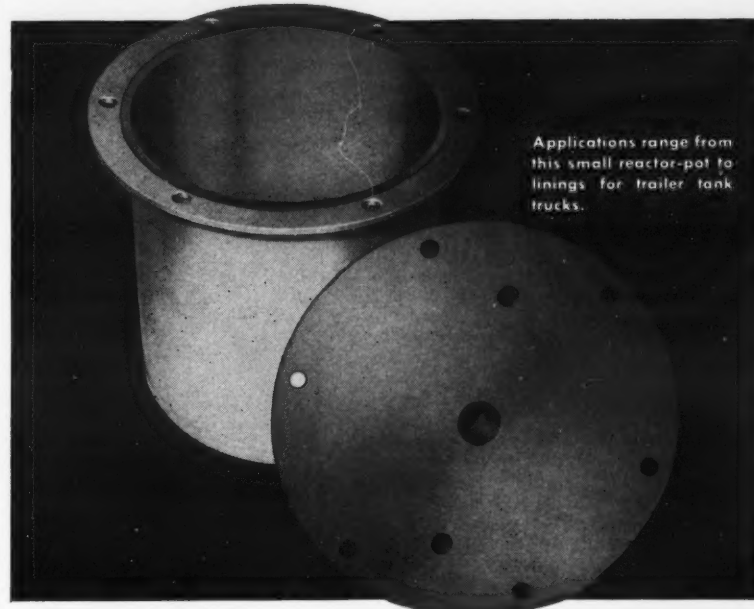


Four loading arms are used to handle four different fluids simultaneously, all controlled from one point

The operation itself might take up to half an hour to make one connection. Handling the hose manually took experience, skill, patience, and frequently, luck to snake it into proper position and make the final coupling. Once in place, the set-up

(Please turn to next page)

now make any vessel CHEMICAL RESISTANT...



Applications range from this small reactor-pot to linings for trailer tank trucks.

...with KEL-F LAMINATE lining

Here is a method for making ordinary plant equipment (new or existing) resistant to gases and liquids as corrosive as fuming nitric acid—and at reasonable cost.

KEL-F Laminate comprises a tough, shatterproof, abrasion-resistant, frictionless surface of KEL-F* fluorocarbon plastic, bonded to a glass-cloth backing for maximum adhesion. It is readily cemented to any material of construction—metal, wood, concrete, etc.—and over a variety of contours.

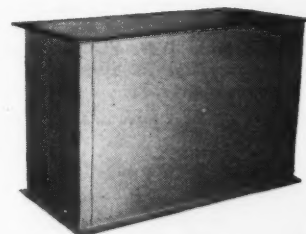
KEL-F, being a thermoplastic resin, seams may be "heat-welded". The result is a continuous surface having zero water absorption and extremely resistant to acids, alkalis, oxidants and solvents at temperatures up to 350°F.

KEL-F Laminates are manufactured by the United States Gasket Company, pioneers and leaders in fluorocarbon plastics, and are available for installation by certified applicators. Write for further information and the name of applicator nearest you.

UNITED STATES GASKET COMPANY, Camden 1, New Jersey

*Trademark, M.W. Kellogg Co.

100 gal. Tank handling acid fluorides, lined with KEL-F Laminate.



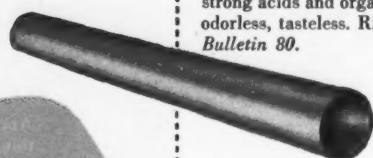
United States Gasket

Plastics Division
OF THE GARLOCK PACKING COMPANY

When inquiring check 3286 opposite last page

TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe ½" to 6". Bulletin 80.



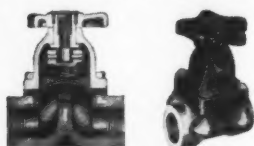
ACE offers 100 years experience to

STOP CONTAMINATION

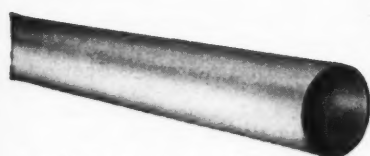
To prevent discoloration, taste, odor or metallic pick-up in your processes, you'll find the best, most economical piping, pumps, valves and tanks among the many ACE rubber and plastic materials. Wide range of temperatures, pressure, impact resistance. Phone nearest American Hard Rubber Company distributor, or write for Technical Data CE-50.

VALVES

for all-plastic piping systems



Trouble-free plastic diaphragm valves . . . choice of general-purpose ACE-ITE, ACE PARIAN (polyethylene) or ACE SARAN. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77 deg. F. Bulletins 80 and 351.



RIGID VINYL . . . STRONG. AGE-PROOF

ACE RIVICOR is a new rigid threaded plastic pipe with good aging and high impact strength. Not affected by most inorganic acids and alkalis, also excellent for many organics. Sizes ½" to 4". Ask for Bulletin CE-56.



1001 USES for ACE-FLEX Tubing

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. ¼" to 1" ID. Bul. 66.



ACE

processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 3287 opposite last page

NEW SOLUTIONS of processing problems

(Continued from preceding page)

still required periodic attention to take up or furnish slack as the tide changed.

Time and space were also wasted in taking hoses in and out of service for hydrostatic testing . . . and if one should burst, harbor cleanup costs as much as \$40,000.

Solution: Richfield purchased and put into operation hydraulically-operated, swivel-jointed, retractable loading arms, consisting of eight-inch pipe rated at 300 psi and having a 6-to-1 safety factor. Jack-knifed in middle with swivel-joint coupling, the pipe is suspended from a movable arm. Entire unit is hydraulically controlled so operator can swing it up from the dock to proper place in front of loading pipe aboard ship. Connection is made by bolting flanges.

Results: Job is done with one man at the controls and two men on shipboard. They can have the facility ready to pump in five to seven minutes. From then on, no further attention is needed until all the fluid has been transferred. Minimum time saving of a quarter-hour per ship-loading is realized. This means less "turn-around time", more trips per tanker, and continuous savings throughout the year.

Maintenance and handling costs have been reduced and safety to personnel increased since the loading arms have been installed.

(Marine loading arms are manufactured by Chiksan Co., Subsidiary of Food Machinery & Chemical Corp., Dept. CP, Brea, Calif. . . or for more information check 3288 on form opp. last page.)



"Short pot life, eh?"

Thanks to George E. Pekarek, The Glidden Company, Cleveland, O.



No gauge glass shutdowns for you

A broken gauge glass could seriously affect a plant's operation.

But it's improbable that it will ever happen to you because your distributor carries CORNING®, PYREX®, and MACBETH® gauge glasses.

Your distributor is a forward-looking businessman who's going to make sure that you get gauge glass service when you need it. You can depend on him.

The glasses he sends you will be naturally longer lived. They fit better, they stand up better to temperature changes, to corrosive effects, to just about every hazard they'd be exposed to.

CORNING INDUSTRIAL GLASSWARE FOR EVERY JOB

Application	Recommended Product
Normal Conditions (Up to 100 p.s.i.)	CORNING brand standard gauge glasses
Higher temperatures	PYREX brand high-pressure gauge glasses
Higher pressures	PYREX brand heavy-wall gauge glasses
Extra visibility	PYREX brand red-line gauge glasses
Heavy-duty service	MACBETH brand flat gauge glasses
Viewing inside furnaces, reactors, pressure vessels, etc.	PYREX brand sight glasses
Lubrication inspection	PYREX brand lubricator glasses
Visible discharge devices	PYREX brand oil cup glasses



CORNING GLASS WORKS

Corning, New York

Corning means research in Glass

When inquiring check 3289 opposite last page

CHEMICAL PROCESSING

NEW SOLUTIONS

Chromium alloy parts resist ammonia at 2000° F

Problem: A large Midwestern company was looking for a metal that would withstand 1600-2000° F ammonia atmosphere for long periods of time. The metal would be used for making shafts, bearings, and other parts.

Solution: Engineers recommended the use of Grade CR-2 chromium carbide, based on previous success with the material as inserts for hot extrusion dies.

After a successful test run, manufacturer ordered a total of 120 parts made of this material. For eight months, these parts were used continuously at 2000°F, five days a week, and idled at 1600°F over the weekends.

Results: Investigation showed that 90 of the 120 parts were still serviceable, and 30 had to be replaced due to warpage caused by distortion of the support members. The fit of the shafts in the bearings was essentially the same as when the parts were first placed into service.

(Grade CR-2 chromium carbide was supplied by Firth Sterling, Inc., Dept. CP, 3113 Forbes Street, Pittsburgh 30, Pa. . . or check 3290 opposite last page.)

Blast cleaning machine case histories

Illustrated 56-page spiral-bound catalog covers complete line of semi-automatic and fully-automatic "Pressure Blast" wet-blast equipment. Eighteen pages are devoted to case histories covering wide range of applications.

Blast Cleaning Machine catalog is issued by The Cro-Plate Co., Inc., Dept. CP, 747 Windsor Street, Hartford 1, Connecticut. Specify 3291 opposite last page.

For more information on product at right, specify 3292 . . . see information request blank opposite last page.



GRATE MAGNET GRABS FAINTLY FERROUS SLAG.

To help reduce rejects in dinnerware (caused by slag in the placing sand) the Buffalo Pottery Company of Buffalo, New York, installed a series of six Eriez Grate Magnets one above the other. The unit is directly below a gyratory riddle which is fed 10 tons of sand per hour. The unique design of the grate assures maximum spreading of the sand over the magnetic elements, without choking the flow of the purged material. The contaminated sand flows through the grates, onto the magnetic tubes and deposits ferrous particles on them. The top grate traps particles of stronger magnetic attraction, while the bottom magnet traps impure sands with so little imbedded iron that reaction to a test magnet is almost negligible. (In a recent quality-control test, an Eriez Grate Magnet removed 93% of a 100-200 mesh iron contamination in one pass through the magnet). Buffalo Pottery reports that since installation of the unit, rejects due to slag and impure sands have been virtually eliminated.



Magnetic ideas from **ERIEZ**

SAFE SAFE! No need to fear this safe will fall! . . . it's held firmly to the hoister by the tremendous magnetic strength of an Eriez Permanent Magnet. Combining herculean power and lifelong dependability, Eriez non-electric Magnets have found practical and valuable uses in industry, where Eriez HI-POWR magnetic separators are used to remove tramp iron from processing lines before it can start fires, damage machinery or cause product contamination. Eriez HI-POWR Automation Units are also used to control, convey and hold metals, from small parts to large steel sheets and pipe. They are easily installed on new or existing equipment, and offer many automated materials handling advantages. All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments; magnetic power is guaranteed forever. The first cost is the only cost.

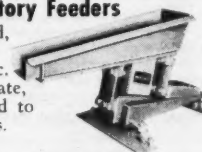


Eriez HI-VI electro-permanent magnetic vibratory equipment

Here's the first complete line of electro-permanent magnetic vibratory equipment that operates at 3600 CPM directly off an AC line. Just plug the units in—no rectifier needed! Eriez HI-VI units provide greater vibratory output with less power consumption. Less maintenance; lower installation costs. Lifetime-powered Alnico V magnetic element produces exclusive "double action" drive for greater productivity.

HI-VI Vibratory Feeders

convey, spread, agitate, cool, blend, mix, etc. Give an accurate, controlled feed to bulk materials.



HI-VI Unit (Bin) Vibrators

self-adjusting units keep bulk materials pouring evenly and smoothly through hoppers, bins, chutes, ducts, etc. Eliminate pile-ups, bridging, sticking, etc.



ROTA-GRATE GOES GREAT! Shown in use at the Columbus, Ohio plant of the American Zinc Oxide Company is a new Eriez development—the Rota-Grate. It's a revolving magnetic unit that provides fast, automatic removal of tramp iron from bulk materials which tend to clog or bridge when passed through small openings. Powerful magnetic tubes are rotated through material flows coming from above, combing and breaking the flows apart and trapping microscopic fines as well as larger pieces of iron. Rota-Grates may be installed at the discharge end of open or enclosed chutes, or may be enclosed within housings in open or closed duct systems. The unit is efficient for removal of ferrous contamination from fine cohesive materials such as cornstarch, lime, gypsum, or from fibrous materials such as alfalfa, flax, chopped hay, etc.

ERIEZ . . . pioneers and world's largest producer of Permanent Non-Electric Magnetic Equipment for Industry have three major product lines to serve your needs.

HI-POWR MAGNETIC SEPARATORS (like those shown above) to remove unwanted iron from processing lines.

HI-POWR MAGNETIC AUTOMATION UNITS to handle untold materials handling problems . . . convey, transfer, control, elevate, re-position, etc., ferrous materials or parts during many manufacturing processes.

And

HI-VI VIBRATORY EQUIPMENT to move and accurately feed bulk materials. ERIEZ "Magnetic Ideas" can help you. Eriez' factory-trained field men, backed by Eriez extensive laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey, and offer helpful "Magnetic Ideas."

WRITE FOR BIG NEW COMPREHENSIVE CATALOG OF ERIEZ ENTIRE LINE TODAY . . . state your particular problem and we'll try to assist. Eriez Manufacturing Company, 735 Magnet Drive, Erie, Pa.

PETRONATE

(Reg. U. S. Pat. Office)

... the oil-soluble petroleum sulfonate for all four major functions ...

- A Emulsification and Dispersion of Liquids**
- B Dispersion and Wetting of Solids**
- C Wetting and Dispersion of Liquid-Solid Systems**
- D Inhibition of Rust and Corrosion**

PETRONATE is the general trade name given by Sonneborn to its various types and grades of oil-soluble petroleum sulfonates.

The chart suggests the broad range of uses for this material. A laboratory sample of PETRONATE will

help you determine how its many advantages can be put to efficient use in your manufacturing processes.

Check the coupon below indicating the use intended so that we can send you the proper type of PETRONATE.

USES OF PETRONATE

APPLICATION	PRIMARY FUNCTION OF PETRONATE	SECONDARY FUNCTION
EMULSIFICATION AND DISPERSION OF LIQUIDS		
1. Insecticide Emulsions	Emulsifying Agent for Toxicant	Spreading Agent
2. Textile Oils	Emulsifying Agent for Textile Processing Oils	Wetting and Dispersing Agent for Textile Fibers
3. Leather Oils	Emulsifying Agent for Leather Processing Oils	Wetting and Dispersing Agent for Leathers
DISPERSION AND WETTING OF SOLIDS		
4. Rubber Manufacture	Thermo Plasticizing Agent	Increases Dispersibility of Filler
5. Fuel Oil	Keeps Sludge in Suspension	Prevents Segregation of Moisture
6. Printing Ink Manufacture	Aids dispersion of pigment	Reduces Viscosity of Ink
7. Ore Flotation	Flotation Reagent	Selective Wetting Agent
8. Additives for Lube Oil	Acts as Detergent	Inhibits Bearing Corrosion
WETTING AND DISPERSION OF LIQUID-SOLID SYSTEMS		
9. Crude Oil Emulsion Splitting	Reverting Agent for Water-in-Oil Emulsions	Aids in Wetting out Salts and Solids
10. Emulsifiable Solvent Cleaners	Dispersing Agent for Oil and Grease Deposits	Acts as Emulsifying Agent
11. Dry Cleaning Compounds	Linking agent for Water and Solvent	Loosens Dirt Absorbed by Fabric
12. Fat Splitting Process	Dispersing Agent for Solid Fats	Acts as Wetting Agent
INHIBITION OF RUST AND CORROSION		
13. Corrosion Preventive Compounds	Rust and Corrosion Inhibiting Agent	Acts as Moisture Barrier
14. Anti-Freeze Solutions	Rust and Corrosion Inhibiting Agent	Aids in Dispersion of Scale
15. Soluble Cutting Oils	Emulsifying Agent for Mineral Oil	Rust Inhibitor

L. SONNEBORN SONS, INC.

New York 10, N. Y.

White Oil and Petrolatum Division, L. SONNEBORN SONS, INC.
300 Fourth Avenue, New York 10, N. Y.

Please send sample of PETRONATE suitable for use indicated below (circle number corresponding to use in chart above).

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Name

Company

Address

City P.O. Zone State

When inquiring check 3293 opposite last page

NEW SOLUTIONS of processing problems

Refractory drying time cut 80% with continuous oven ...

takes 1 to 2 days instead of former 11 days

Problem: Industrial acceptance for its new chemically-bonded all-silica refractory was so high that production facilities at Illinois Clay Products Company, Joliet, Illinois, could not keep up with the demand. The big bottleneck was the drying operation. Using conventional kiln firing, it took almost 11 days to dry a batch of bricks.

Solution: About a year ago, company installed a high-temperature, air-circulating-type oven to dry the product. Unit is 100' long, 6' high, and 7¾' wide. Oven is constructed of 8" concrete block with 4" poured insulation on the roof.

Heart of the unit is an oil-fired, two million Btu-per-hr heater capable of maintaining temperatures up to 780°F. Combustion chamber of this heater



About 16,000 all-silica refractory bricks are dried each day in 4600-cu ft air-drying oven

is fabricated of high-temperature, corrosion-resistant, stainless steel (310 and 430) to withstand the severe service. Unit is fired with No. 4 fuel oil.

A 25,000-cfm fan provides air circulation. Shaft bearings and 15-hp motor for fan are located outside heater casing because of high temperature air that is handled. Air is supplied to the oven and returned to heater through a partitioned chamber about same size as oven and located directly under it.

Oven can hold 28 deck cars of bricks, 14 cars on each of two tracks. The all-silica bricks are formed in presses and stacked on deck cars in such a pattern that air can circulate freely around them. About every hour, two cars of freshly formed

(Please turn to page 75)

For more information on product advertised at right, specify 3294 ... see information request blank opposite last page.

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Copy Anything

with **magic touch dial control**



* Just turn the dial
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The dial is the secret of the world's easiest copying method. It automatically makes all adjustments to copy anything.

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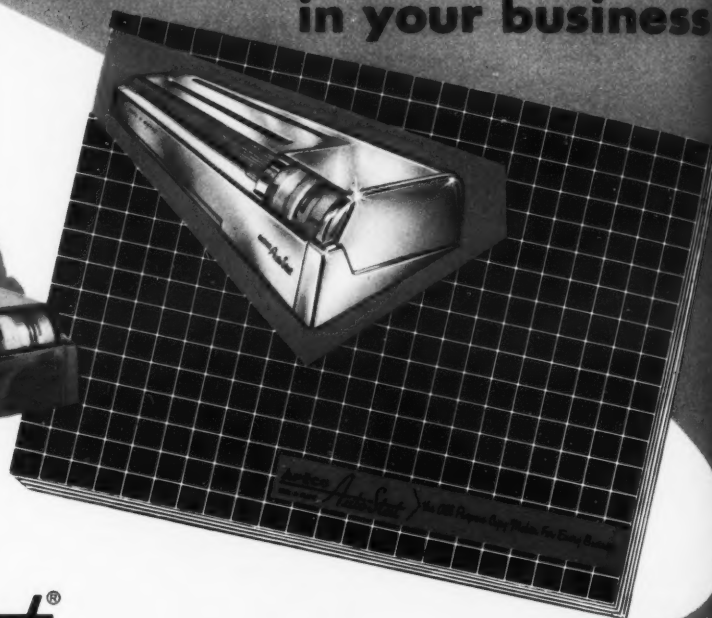
Type of Business _____

In Canada: Apeco of Canada Ltd., 134 Park Lawn Rd., Toronto, Ont.

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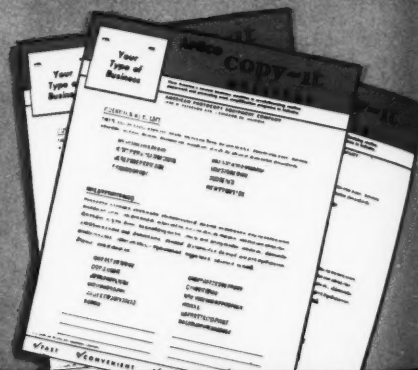
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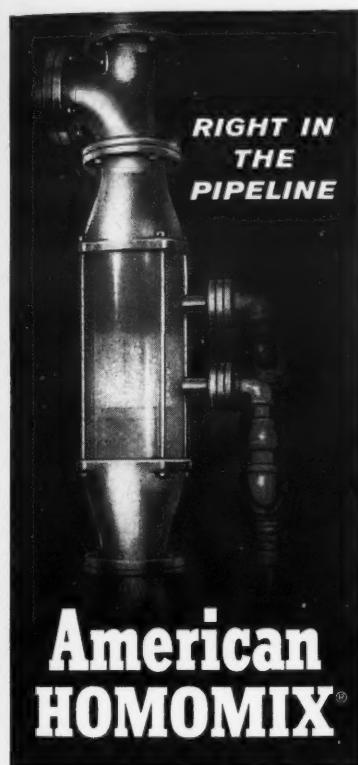
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Sales Offices: Chicago, New York, and other principal cities

When inquiring check 3295
opposite last page

NEW SOLUTIONS of processing problems

(Continued from page 74)

bricks are charged into one end of oven and two cars are removed from the other end.

Results: Drying the bricks is now a continuous process. Time involved varies from 24 to 48 hr — as compared to the 11 days required by the old batch method. Bottleneck has been eliminated and orders are filled rapidly. Production capacity averages about 16,000 bricks daily.

(Counterflo oil-fired heater for oven was supplied by Dravo Corporation, Dept. CP, Neville Island, Pittsburgh 25, Pa. . . or for more information check 3296 on form opposite last page.)

Emergency shutdown eliminated in 12-12-12 processing at Allied Chemical

Problem: Failure of belts driving disintegrators caused shutdown of 12-12-12 operation at Nitrogen Div., Allied Chemical & Dye Corp., South Point, Ohio. Disintegrators, called cage mills, are used to break oversize fertilizer into proper size. When belt failed, 15 hours of maintenance work were required to replace it.

Solution: At the suggestion of Mr. M. H. Young, a field machinist for the company, an auxiliary belt was placed on shaft of motor driv-



Mr. M. H. Young (left) and Mr. Claud Bond install auxiliary belt on motor shaft. Motor drives fertilizer disintegrator

ing cage mills at regular plant shutdown period. A metal guard was fabricated for belt so that it could remain on shaft without turning. Handy storage box holds belt, protecting it, and keeping it out of way until needed.

Results: "Spare" belt can be slipped into place and cage mill returned to operation in about 30 minutes. No interruption of manufacturing process is necessary.

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Performance
Because it's Best
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When inquiring check 3297 opposite last page

**CORROSION
RESISTANT**



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- STAINLESS STEEL
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Wherever wire rope is exposed to: Alkaline condition, oxidizing acids, neutral brines, foods, aromatic chemicals, and marine atmosphere, there is a Macwhyte Wire Rope available.

Macwhyte corrosion resistant Wire Rope is made in a wide range of sizes, types, flexibility and strength to meet the most exacting requirements.

All types of Macwhyte cable are in stock from our mill depots from coast to coast. Recommendations and prices will be given upon request.

1126

SEND FOR FREE BULLETIN 4930

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2906 Fourteenth Avenue
Kenosha, Wisconsin

My cable uses are _____

Name _____

Title _____

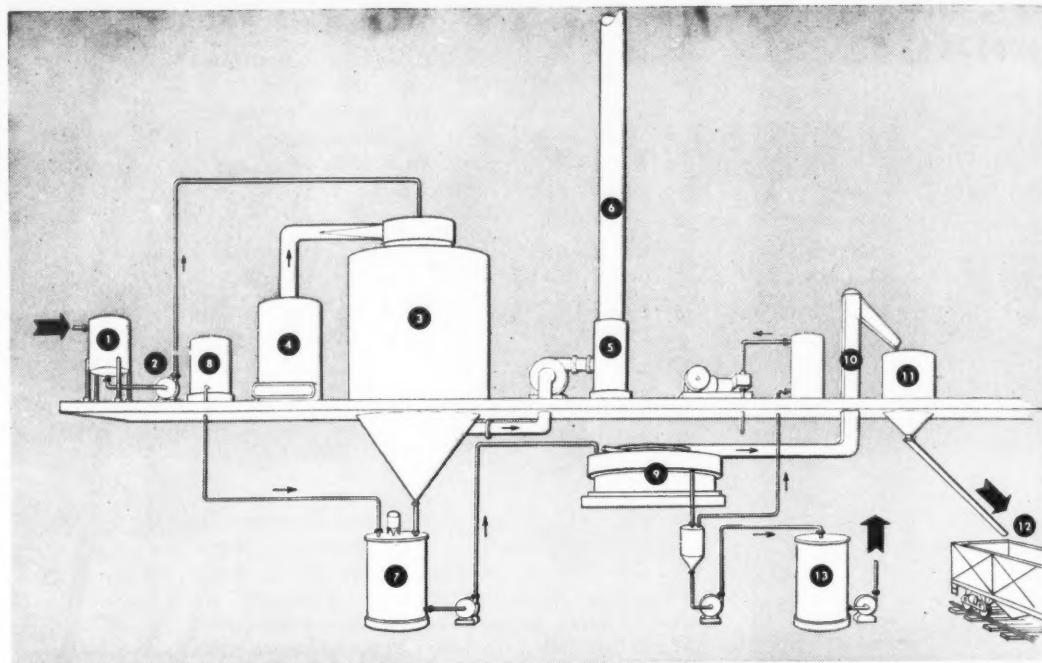
Company _____

Address _____

City _____ State _____

When inquiring check 3298 opposite last page

ideas — from other industries and nuclear field . . .
new trends in research, processes, services



Sulfuric acid recovery process is especially suited for large continuous pickling operations

Simple, continuous process may eliminate steel mill waste-acid disposal problem. Using spray dryer to concentrate spent liquor, method provides for . . .

economic regeneration of waste pickle solutions

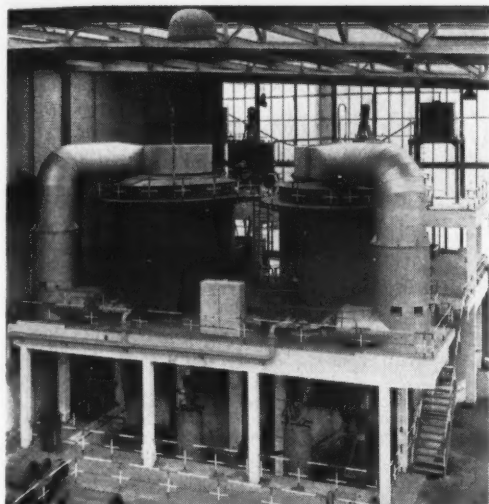
Recovers all of available free acid; make-up required is no more than that consumed in pickling operation

The problem that has plagued steel manufacturers and fabricators for over a generation — what to do with waste pickling solutions — may be solved by a European process. Developed by Zahn and Company, a chemical engineering firm of West Berlin, the process is a commercial implementation of a technique patented by Inland Steel Company and assigned to Koppers Company, Inc., who have exclusive rights to the process in the US and

Canada. Koppers will make available, on a licensing basis, design and operational data of three European commercial plants that are successfully using the process.

Especially suited for large continuous pickling operations, the process provides for the recovery of all the available free sulfuric acid remaining (up to 50 percent of original charge) in the pickle liquor. The amount of make-up acid required is no more than that actually consumed in the pickling reaction, plus whatever losses are normally involved in a steel finishing process.

The process is continuous, simple, and economic. Key equipment is spray dryer, which concentrates



Key equipment in process is spray dryer, which concentrates spent liquor to slurry of ferrous sulfate monohydrate crystals suspended in acid. Twin monohydrate plant shown above is located in Germany

spent liquor to slurry of iron sulfate crystals suspended in concentrated acid. After separating the crystals, acid is diluted and recycled back into pickling bath.

Process Description

As shown in the accompanying flow diagram, pickle liquor direct from the baths or from holding tanks (1) is pumped (2) to the atomizing spray head in the spray dryer (3) where it meets a blast of hot air and flue gases. These may be provided by a gas or oil combustion chamber (4) or they may be supplied by adjacent sources of flue gas blended with the correct quantity of excess air. Water is evaporated, concentrating the acid. Vapor-laden air is discharged to atmosphere through wire-mesh mist eliminator (5) and stack (6).

The concentrating process causes about 40 percent of the ferrous sulfate monohydrate to crystallize out of the solution. Slurry is dropped into one of three crystallizing tanks (7) where 66° sulfuric acid from a metering tank (8) is added. Adding the make-up acid further increases the acid concentration of the slurry, causing more monohydrate to drop out. Salt concentration is so reduced that, on ultimate dilution to correct pickling strength, regenerated liquor contains no more than 1-2 percent iron.

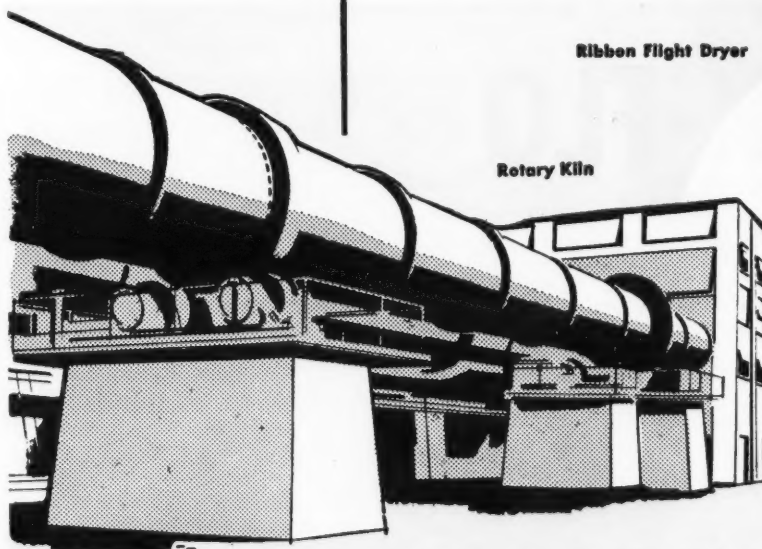
Slurry is separated in a vacuum filter (9) and washed to remove residual acid. Dried salt is conveyed (10) to bins (11) or hopper cars (12) for sale or disposal. Crystals could also be processed further for recovery of iron and sulfuric acid equivalent, if desired.

(Please turn to next page)



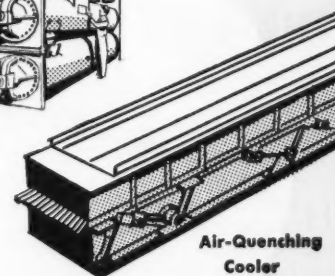
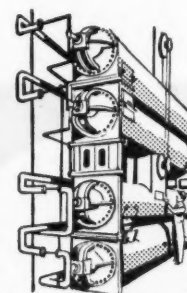
Partial List of Material Processed with Allis-Chalmers Heat Transfer Equipment

- Limestone
- Lime
- Dolomite
- Magnesia
- Alumina
- Bauxite
- Manganese Oxide
- Iron Ore
- Phosphates
- Refractories
- Foundry Sand
- Petroleum Sand
- Petroleum Coke
- Fuller's Earth
- Nickel Ores
- Copper

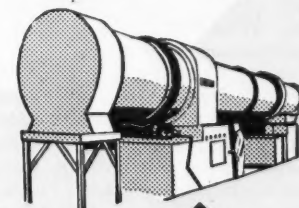


Ribbon Flight Dryer

Rotary Kiln



Air-Quenching Cooler



Rotary Dryer

You'll want Bulletin 25C6177. See your nearby A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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A-5325

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Obtaining increased production, lower processing costs and improved product quality is more than a matter of installing the best heat transfer equipment. Maximum utilization of that equipment also calls for an efficient flow design. You get both from Allis-Chalmers.

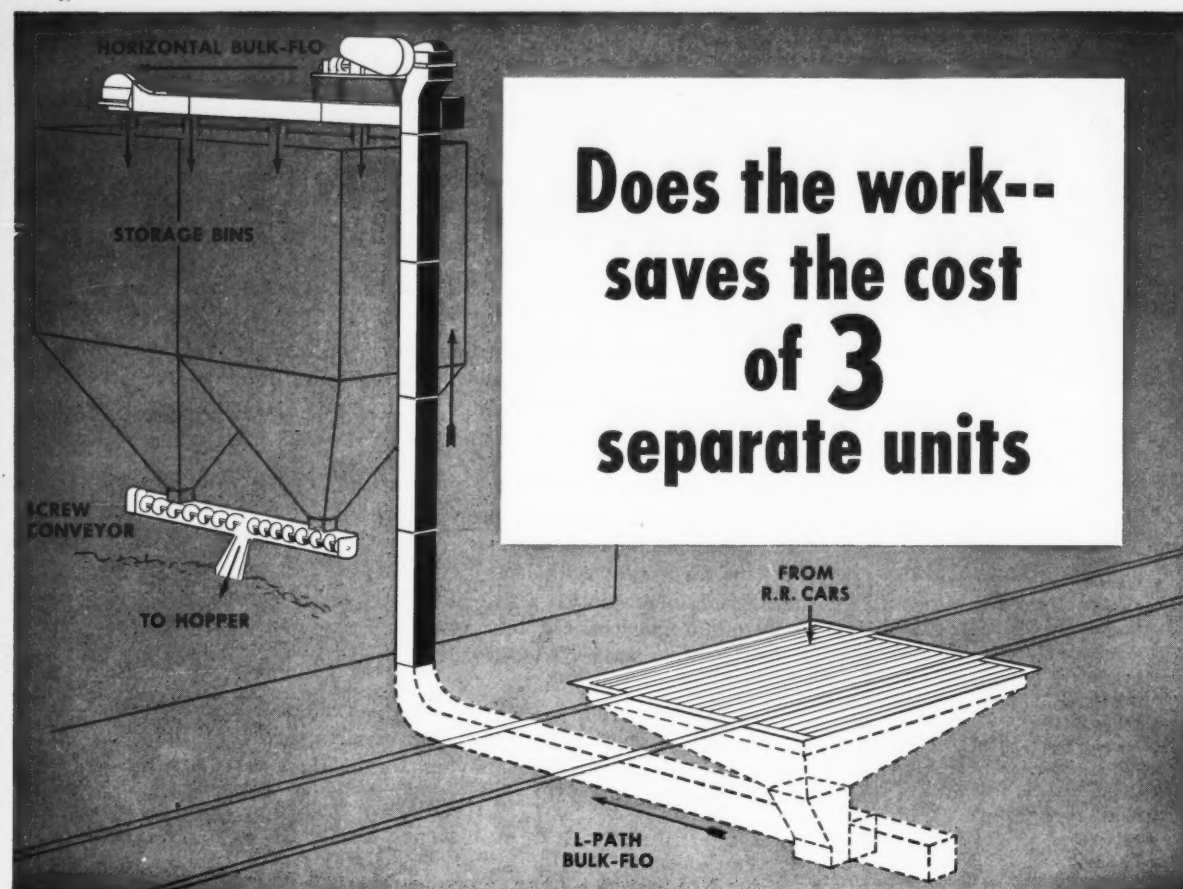
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When inquiring check 3299 opposite last page



Bulk-Flo conveyors carry material from railroad cars to storage bins. Horizontal run of L-path unit

is below ground level and vertical lift delivers to a horizontal Bulk-Flo on the roof.

LINK-BELT BULK-FLO

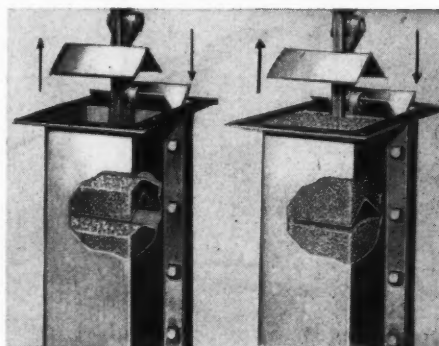
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BULK-FLO FEEDERS • CONVEYORS • ELEVATORS

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When inquiring check 3300 opposite last page

IDEAS

Waste Pickle Solutions

(Continued from preceding page)

Mother liquor, which contains about 35 percent sulfuric acid, is pumped to a holding tank (13) from which it may be metered directly back to the pickling tanks along with the required quantity of dilution water from the rinse tanks. No reheating of the solution is required, since the temperature, which is lowered in the evaporation step, is brought back to 200°F by the heat of dilution of the fresh acid.

Other Advantages

In addition to eliminating the waste problem, the process has other advantages. Labor costs are low. Only one man is needed to operate the entire plant. Maintenance costs are low too. One European plant, which has used the process for over four years, has yet to experience a shutdown due to equipment or material failure. Benefits are also obtained in the pickling process. Experience shows that use of the regeneration process results in higher and more uniform acid concentrations in the baths. This permits faster steel processing at no increased cost.

(Further information on this spent pickle liquor recovery process can be obtained from Koppers Company, Inc., Dept. CP, Pittsburgh 19, Pa. . . or by check 3301 on form opposite last page.)

'Slow-fast' nuclear reactor in operation at Argonne . . .

unit is, in a sense, a reactor within a reactor

Experimental nuclear reactor in operation at Argonne National Laboratory can operate at extremely low power with exactly the same behavior and operating characteristics that it would have at a much higher operating power. Known as Zero Power Reactor No. V (ZPR-V), the unit is being used to facilitate studies of the fundamental principles upon which future large power reactors may be designed and constructed.

Unit consists of a five ft-diameter steel tank in which the uranium fuel assemblies and control rods are placed. In center of tank is the "fast" reactor section which contains 49 enriched uranium fuel assemblies placed in a two foot-square section. Surrounding this section is the "slow" reactor section consisting of normal and enriched uranium fuel elements arranged in a geometric pattern around the fast core section and immersed in water. Unit is, in a sense, a reactor within a reactor.

The reactor is unique in that the nuclear chain reaction takes place in both regions although they have entirely different nuclear properties. Unit utilizes the best feature of each of the two types of reactors — safety and ease of control of a slow

reactor, and the superior nuclear properties of a fast reactor. By connecting the two systems together, it becomes possible to study the nuclear physics of fast reactors without acquiring the control difficulties associated with this reactor type.

The nuclear reaction is started in the slow section. Neutrons, created in the fission process, pass through the steel wall into the fast section where they cause fission in the enriched uranium. A nuclear chain reaction cannot be established or maintained in the fast section unless it is maintained in the slow section.

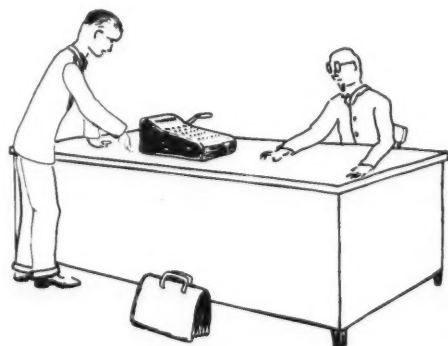
By making the fast section depend upon neutrons from the slow section, it is possible to control the fast section simply by moving a number of cadmium or boron control plates located in the slow section. By inserting these into the slow section, the chain reaction in this area is instantly stopped.

(Information courtesy US Atomic Energy Commission, Argonne National Laboratory, Dept. CP, Lemont, Illinois.)

Reducing barometric pressure effect in octane number measurements

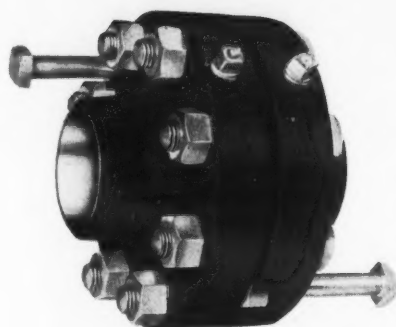
Technical publication of 28 pages presents methods for reducing the effect of barometric pressure in measurement of octane number. Report covers series of tests in which inlet temperature and compression ratio were adjusted to produce more uniform compression temperature-density relationships regardless of barometric pressure.

To obtain Special Technical Publication 186, remit \$1.50 to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.



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When inquiring check 3302 opposite last page

The latest advancement in

dust recovery

Dualaire*

REVERSE-JET DUST COLLECTOR!



- Cleans without jarring or rapping!
- Maintains uniformly low pressure drop!
- Field-proven efficiency as high as 99.99%!

Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these...

REVERSE-JET CLEANING ACTION

cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

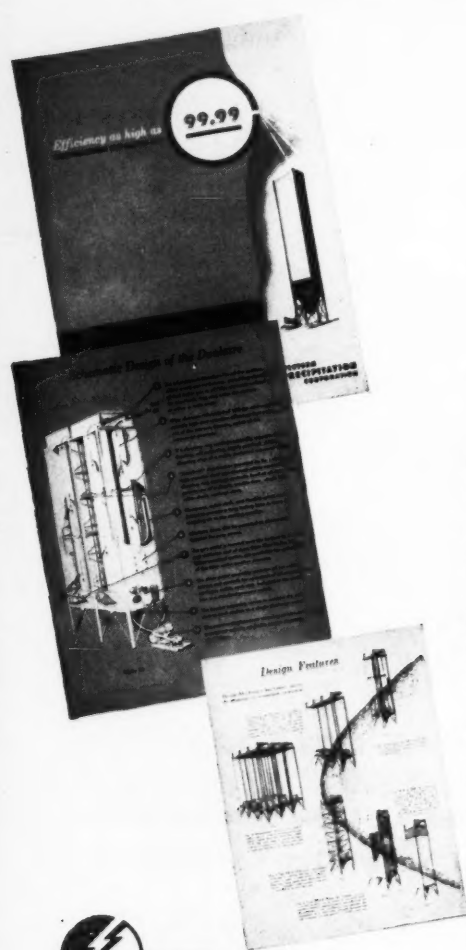
FILTER EFFICIENCY remains uniformly high at all times because no thick filter cake ever forms to reduce operation

effectiveness. Actual field tests show efficiencies as high as 99.99%!

NO STANDBY UNITS, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors. A new 8 page booklet gives the full story... explains how reverse-jet cleaning action works—provides facts, figures and illustrations that will change your thinking on filter-type recovery systems. Send for your free copy of this descriptive booklet—or see your nearest Western Precipitation representative!



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When inquiring check 3303 opposite last page

IDEAS

Flat-loading sheets on charging car cuts waste, streamlines handling in vacuum annealing furnace...

can process several tons of titanium sheets per charge

Vacuum annealing furnace, reported to be largest in capacity of its type, serves dual purpose of quality improvement and heat treatment of titanium sheets. Sheets can be either loaded flat on a charging car,



Vacuum annealing furnace for titanium sheets has no insulation. Exterior is water-cooled

which is rolled into the furnace, or they can be suspended vertically in the conventional manner. Flat loading method eliminates waste resulting from punching of sheets for vertical hanging, and also speeds handling.

Horizontal charging method was made possible by elimination of insulating materials from the furnace. No refractory brick linings are used either. Since most of heat transfer in a furnace is by radiation, heating elements are placed within the retort, and radiation shields serve as thermal insulation. Exterior of furnace is water-cooled, to prevent distortion by warping.

Furnace, which has charge space of 4 x 4 x 12 ft, can process several tons of titanium sheet per charge. Unit has rating of 450 kw, maximum operating temperature of 1600°F, and can be evacuated to one-millionth of an atmosphere.

(Vacuum annealing furnace is installed at Mallory-Sharon Titanium Corp., Dept. CP, Niles, Ohio.)

CP's large page size...

... is a big help in presenting articles for clarity, readability, "impact." Read what Art Editor Harley Lichtenberger has to say about this "editorial acreage."

... on page 213

IDEAS

Method for converting bark into effective, low cost soil builder . . .

product turns clay, sand into rich soil

A method for converting bark into an inexpensive and effective soil builder has been developed. Used in conjunction with fertilizer, bark soil builder turns clay and sand into rich loamy soil by loosening, improving moisture holding capacity, serving as base for fertilizer, and controlling rate at which plants obtain their food from soil.

In clay, product gave 120% more growth than fertilized controls, and 28% more growth than addition of soil conditioner. In sand, product gave 46% more growth than fertilized controls, 92% more growth than peat moss additions, and 134% more growth than sand with synthetic exchange resins added. More research is being conducted on product.

(Bark soil builder was developed at Armour Research Foundation, Illinois Institute of Technology, Dept. CP, 35 W. 33rd St., Chicago 16, Ill.)

Photo-copying equipment operates in daylight

How company's drafting division uses photo-copying equipment that operates in daylight to copy 4000 to 8000 items weekly is explained in four-page brochure. Advantages of the equipment, which turns out clear copies up to 18 x 24", are pointed out.

"Rectigraph" brochure is issued by The Haloid Co., Dept. CP, Rochester 3, N. Y. When inquiring specify 3304 on form opposite last page.

For more information on product at right, specify 3305 . . . see information request blank opposite last page.

FOR CATALYTIC REFORMING

4 B&W Refractory Castables

with low iron content

B&W Kaocast

Ten years ago, B&W introduced this 3000° castable which offers a combination of high temperature use limit, as well as very low iron content. B&W Kaocast can either be gunned or cast in place.

B&W Kaocrete-LI

After two years of extensive field service, B&W adds Kaocrete-LI to low iron content castables. B&W Kaocrete-LI, which has an iron content of less than 1%, has exceptionally high strength for resistance against abrasion and erosion. It has sufficient refractoriness for use at temperatures to 2700 F. Suitable for both gunning and casting.

B&W Kaolite-LI

Another new castable with over two years of field service, B&W Kaolite-LI has high insulating properties due to its light weight (only 59 pounds per cubic foot). Its iron content is also less than 1%. It is designed to be applied with a cement gun only. Installation and maintenance time can be cut since Kaolite-LI does not require water curing and heat can be applied directly after gunning.

B&W Kaocrete-32

Developed for special high temperature service, B&W Kaocrete-32 has extremely high strength and a use limit of 3200 F. It can be poured, plastered or gunned into place.

Properties of B&W Low Iron Castables

		B&W Kaocast	B&W Kaocrete-LI
Use limit, °F		3000	2700
Melting point, °F		3200	3100
Average density lb/cu ft after firing		126	126
Average % Fe ₂ O ₃		1.0	0.5
Cold crushing strength— psi average— after heating for 5 hrs. at:	1000 F	700	2500
	1500 F	500	2500
	2000 F	400	1200
	2200 F	500	1300
	2400 F	500	1600
	2600 F	1000	6000
	2800 F	2200	—
	3000 F	3500	—
Permanent linear shrinkage— average % less than— after heating for 5 hrs. at:	3200 F	—	—
	1000 F	0.3	0
	1500 F	0.3	0
	2000 F	0.5	0
	2200 F	0.5	0
	2400 F	0.5	+0
	2600 F	0.5	—
	2800 F	0.5	—
	3000 F	0.3	—
	3200 F	—	—

Consult your B&W Representative for additional information on these and other B&W Refractories for the refining industry.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

B&W
& W

THE B&W
REFRACTORIES
CORPORATION
CHICAGO, ILL. 60601
B&W-1000

The latest advancement in

dust recovery

Dualaire*

REVERSE-JET DUST COLLECTOR!



- Cleans without jarring or rapping!
- Maintains uniformly low pressure drop!
- Field-proven efficiency as high as 99.99%!



Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these...

REVERSE-JET CLEANING ACTION

cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

FILTER EFFICIENCY remains uniformly high at all times because no thick filter cake ever forms to reduce operation

effectiveness. Actual field tests show efficiencies as high as 99.99%!

NO STANDBY UNITS, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors. A new 8 page booklet gives the full story... explains how reverse-jet cleaning action works—provides facts, figures and illustrations that will change your thinking on filter-type recovery systems. Send for your free copy of this descriptive booklet—or see your nearest Western Precipitation representative!



COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Reverse-Jet Filters
HOLO-FLITE Processors

*"Dualaire" & "Multiclone" ®

Western Precipitation Corporation

Designers and Manufacturers of Equipment for Collection of Suspended Material from Gases ... and Equipment for the Process Industries

Main Offices: 1023 WEST NINTH STREET, LOS ANGELES 54, CALIFORNIA

Chrysler Building, New York 17 • 1 North La Salle Street Building, Chicago 2 • Oliver Building, Pittsburgh 22 • 3252 Peachtree Road N. E., Atlanta 5 • Hobart Building, San Francisco 4

Precipitation Company of Canada Ltd., Dominion Square Building, Montreal
Representatives in all principal cities

When inquiring check 3303 opposite last page

IDEAS

Flat-loading sheets on charging car cuts waste, streamlines handling in vacuum annealing furnace...

can process several tons of titanium sheets per charge

Vacuum annealing furnace, reported to be largest in capacity of its type, serves dual purpose of quality improvement and heat treatment of titanium sheets. Sheets can be either loaded flat on a charging car,



Vacuum annealing furnace for titanium sheets has no insulation. Exterior is water-cooled

which is rolled into the furnace, or they can be suspended vertically in the conventional manner. Flat loading method eliminates waste resulting from punching of sheets for vertical hanging, and also speeds handling.

Horizontal charging method was made possible by elimination of insulating materials from the furnace. No refractory brick linings are used either. Since most of heat transfer in a furnace is by radiation, heating elements are placed within the retort, and radiation shields serve as thermal insulation. Exterior of furnace is water-cooled, to prevent distortion by warping.

Furnace, which has charge space of 4 x 4 x 12 ft, can process several tons of titanium sheet per charge. Unit has rating of 450 kw, maximum operating temperature of 1600°F, and can be evacuated to one-millionth of an atmosphere.

(Vacuum annealing furnace is installed at Mallory-Sharon Titanium Corp., Dept. CP, Niles, Ohio.)

CP's large page size...

... is a big help in presenting articles for clarity, readability, "impact." Read what Art Editor Harley Lichtenberger has to say about this "editorial acreage."

... on page 213

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		B&W Kaocast	B&W Kaocrete LI	B&W Kaolite LI	B&W Kaocrete 32
Use limit, °F		3000	2700	2300	3200
Melting point, °F		3200	3100	2700	3297
Average density lb/cu. ft after firing		126	131	59	134
Average % Fe ₂ O ₃		1.0	0.9	0.8	1.0
Cold crushing strength—psi average—after heating for 5 hrs. at:	1000 F	700	2500	350	1000
	1500 F	500	2500	350	800
	2000 F	400	1200	300	750
	2200 F	500	1300	450	1000
	2400 F	500	1600	—	2000
	2600 F	1000	6000	—	3000
	2800 F	2200	—	—	3500
Permanent linear shrinkage—average % less than—after heating for 5 hrs. at:	3000 F	3500	—	—	4000
	3200 F	—	—	—	5000
	1000 F	0.3	0.2	0.3	0.2
	1500 F	0.3	0.2	0.4	0.2
	2000 F	0.5	0.2	0.4	0.2
	2200 F	0.5	0.2	0.6	0.4
	2400 F	0.5	+0.1	—	0.5
	2600 F	0.5	—	—	0.5
	2800 F	0.5	—	—	0.5
	3000 F	0.3	—	—	0.2
	3200 F	—	—	—	0.1

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRATORIES DIVISION
GENERAL OFFICES: 181 EAST 42ND ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

Consult your B&W Representative for additional information on these and other B&W Refractories for the refining industry.

B&W REFRATORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

IDEAS

Oil tankers switch from crude to edible oil cargo quickly and inexpensively . . .

use of detergent permits "two-way" profits

Development of new chemical detergent makes it possible for oil tanker to switch quickly and inexpensively to cargo of edible oil or even grain on its return trip. Use of detergent eliminates non-revenue sailings and permits ship-owners to realize two-way profits.

After unloading crude oil cargo, ship's tanks are cleansed by hot-water solution of chemical detergent, applied by hose equipped with spinning nozzle. Solution is recirculated through one tank after another. Tanks are left "kitchen clean" without costly, time-consuming scrubbing, and ship is ready to take on new cargo for return trip. Use of detergent is reported to cut costs of tank cleaning as much as 60%.

("Planisol" granular detergent is marketed by Dunham Chemical Co., Div. of National Cylinder Gas Co., Dept. CP, 840 N. Michigan Ave., Chicago, Ill. . . . or check 3306 on form opposite last page.)

AEC offers processing service for private reactors . . .

also includes waste disposal

A policy to provide for chemical processing services for operators of private nuclear reactors has been established by the Atomic Energy Commission, pending setting up of commercial services to do the work.

The new policy is intended to give further encouragement to development of private atomic energy industry. It provides reactor operators an assured means of recovering valuable constituents remaining in spent fuel elements and also covers waste disposal. Commission is prepared to provide these services for period extending to June 30, 1967.

(Information courtesy of United States Atomic Energy Commission, Dept. CP, Washington 25, D.C.)



The Foxboro M/58 Consotrol Controller (shown full size, without cover). Can be panel-mounted on Consotrol Control Station, or field-mounted.

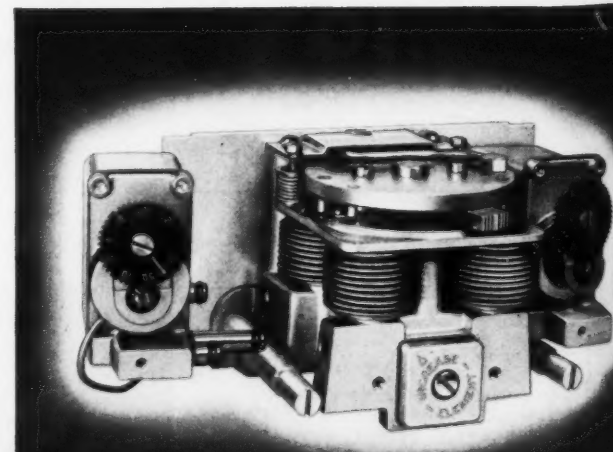
THE FOXBORO ^M/₅₈ CONSOTROL

The M/58 Controller's Revolutionary Floating Disc System

Here's the exclusive Foxboro design development that gives M/58 Control its unique versatility, precision, and stability. The floating disc and matched bellows assure uniformly high controller sensitivity and pin-point control action, even at widest settings of the proportional band. Lever-set proportional band adjustment is calibrated to 500%.

Component Construction Gives Unrivalled Versatility

Not only is the complete controller easily detachable as a unit, but also, each component is a "plug-in" unit. For example, reset plugs in at right as shown; derivative, similarly, at left. All 4 control actions, with 2 reset ranges, are available and easily adjustable to widest variations in operating conditions. Proportional action from 1 to 500% quickly set by lever.



**Will test aircraft, missiles
at 10,000 mph, 9000°F . . .**

high-temperature test facility
being built for ARDC

The realistic testing of aircraft and missiles in airflow of 10,000 mph and 9000°F for relatively long periods of time will soon be possible. Test facility being built for Air Research and Development Command will permit study of materials, structures, and aerodynamic problems of aircraft and missiles flying at hypersonic speeds.

Significant feature of the facility will be its ability to operate for periods of 15 seconds or longer. Present test facilities can produce high temperatures and speeds for only a few thousandths of a second. Air will be used as test gas, enabling actual flight in earth's atmosphere to be simulated.

(High-temperature test facility is being developed for ARDC by Cornell Aeronautical Laboratory, Inc., Dept. CP, Buffalo, N.Y.)

**Gives data, flow sheets
of nitrogen chemicals**

Brochures contain descriptive data on nitric acid, ammonium nitrate solid (CSC Stengel granule process), ammonium nitrate solutions (CSC Stengel process), prilled ammonium nitrate (CSC Stengel process), conventional prilled ammonium nitrate, and complex fertilizer (Potasse et Engrais Chimiques process). Each brochure is accompanied by diagrammatic flow sheet.

Nitrogen chemicals brochures and flow sheets are issued by The Chemical and Industrial Corp., Dept. CP, 256 McCullough St., Cincinnati 26, Ohio. When inquiring specify 3307 on form opp. last page.

For more information on product at left, specify 3308 . . . see information request blank opposite last page.

Outperforms all other controllers !

...the controller with the FLOATING DISC

If you think this claim is exaggerated, just put a Foxboro M/58 Consotrol* Controller on your process. The tougher the job, the more it will outperform other controllers! Or ask any present user . . . many of the largest, most progressive petroleum and chemical processors are using hundreds of these instruments. They will unhesitatingly confirm that this exclusive Foxboro development has put their processes "on stream", automatically and smoothly from the control room, without false starts or confusion.

The M/58 Controller can do the same for your process. The flexibility of its control functions makes

it readily adaptable to all processing techniques. All four actions are available, with two ranges of reset . . . all are easily adjustable to the most widely varying operating conditions. For example, reset and derivative functions plug in . . . proportional action from 1 to 500% can be quickly set by a lever. And calibration is a simple zero adjustment!

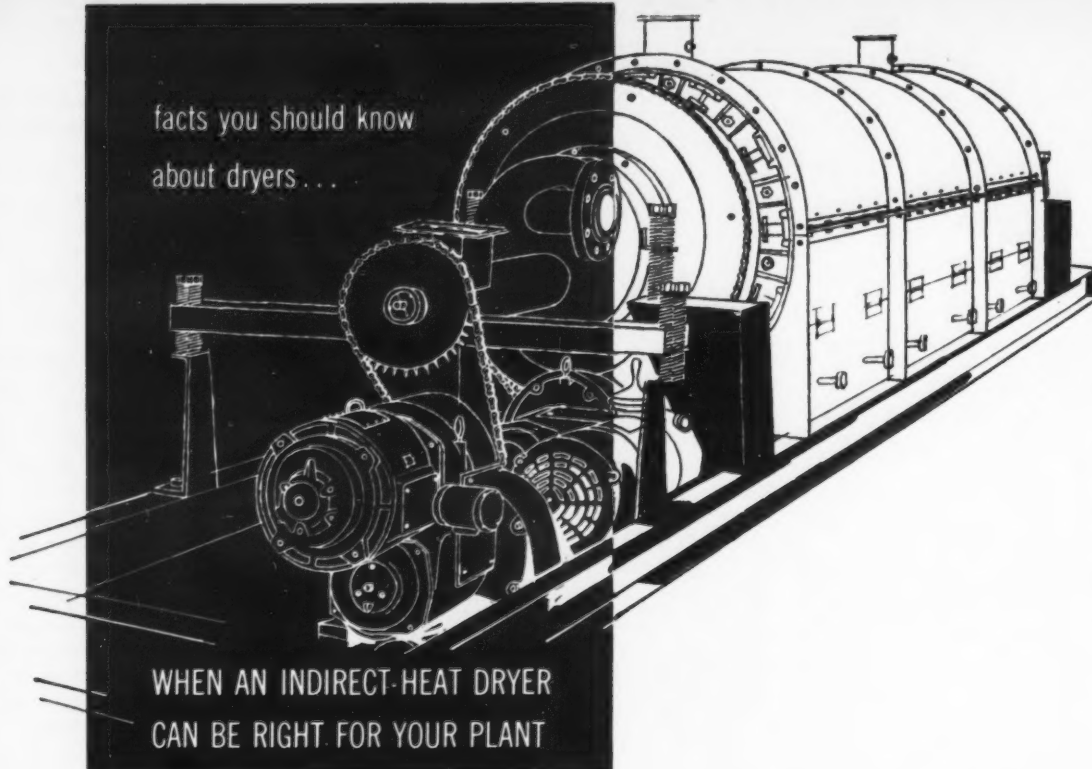
Get full details on this simple, truly "universal" Controller. Write for Bulletin 13-19 and ask your Foxboro Sales Engineer for a demonstration. The Foxboro Company, 815 Neponset Ave., Foxboro, Mass., U.S.A.

FOXBORO

Reg. U.S. Pat. Off.

CONSOTROL INSTRUMENTS

facts you should know
about dryers...



WHEN AN INDIRECT-HEAT DRYER
CAN BE RIGHT FOR YOUR PLANT

For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example...

Q. My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the

dust problem and the heat cost.

Q. What is meant by an indirect-heat rotary dryer?

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. How does an indirect-heat dryer minimize the dust problem?

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating

of the material. Generally, this low air velocity results in insignificant dust loss.

Q. How does this differ from the operation of a direct-heat dryer?

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?

A. The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.



LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky

Eastern Sales Office: 380 Madison Avenue, New York 17, New York

In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada

General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 3309 opposite last page

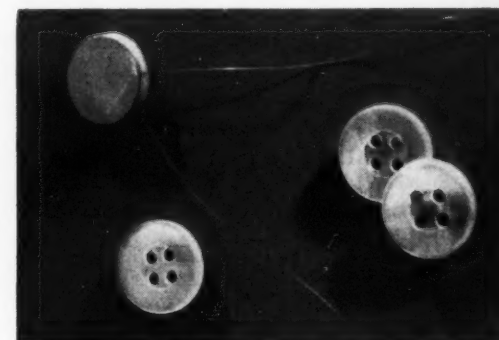
IDEAS

Tiny nuclear battery delivers power for period of five years

Completely safe, unit has nominal output of 20 microwatts

Miniature nuclear-powered battery capable of delivering continuous electrical power for at least five years has been developed jointly by Elgin National Watch Co. and Walter Kidde Nuclear Laboratories, Inc. Approximately the size of thumb-tack head, battery has nominal power output of 20 microwatts. According to its inventors, it is first such device to be completely safe for extensive personal use without special precautions. Decay energy of beta-emitting radioisotope is used as source of energy.

Operation of battery depends upon conversion of energy — from beta emissions to light, and from light to electricity. Light source consists of mixture of finely divided phosphor and an oxide of promethium 147, one of most abundant nuclear fission prod-



Nuclear battery, shown without metal shield, is about the size of a man's shirt button

ucts. Beta particles emitted by promethium are absorbed by phosphor and converted into red and infrared light. This light is captured by two or more photocells and transformed into electrical current.

Prototype battery uses about 4½ curies of promethium 147, which has half-life of 2.6 years and maximum beta energy of 0.223 mev. This has a weight in form of oxide, Pm_2O_3 , of only 5 mg. With this amount of activity, battery has nominal power output of 20 microwatts when new, 10 microwatts after 2½ years, and 5 microwatts after about five years. Relatively low radiation of promethium allows all of its energy to be absorbed in layer of phosphor having weight of 50 mg/sq cm (approximately 0.005" thick). Practical phosphor particle size range was found to lie between 10 and 50 microns.

Light source has active area of 1 sq cm, and diameter of 7/16". Each face of light source is covered either with one circular photocell or two semi-circular photocells. By connecting photocells in parallel or in series, voltage may be varied from about ¼ to 1



Stop that leak quickly, permanently and easily . . . apply DEVCON directly to the tank or on a piece of kraft paper and the problem is solved. DEVCON has excellent chemical resistance . . . will not rust or corrode . . . self-curing, hardens even under water.

THE PLASTIC STEEL will repair leaking pipes (even under pressure) . . . rebuild worn valve seats or pumps . . . fill large or small holes in castings . . . repair or rebuild machinery . . . make molds and dies . . . handle hundreds of maintenance jobs in the plant. DEVCON bonds steel, iron, brass, bronze, aluminum, wood, glass, concrete, etc., to itself or each other. Non-shrinking, non-expanding it has extreme strength and durability . . . can be drilled, threaded or ground with regular metal-working tools.

DEVCON, available in four types, can save hundreds of hours and thousands of dollars, throughout your plant — write for free booklet containing proof of its many applications.

TECHNICAL REPRESENTATIVES AND DISTRIBUTORS IN ALL MAJOR CITIES

DEVCON CORPORATION

139 Endicott Street, Danvers, Mass.

When inquiring check 3310 opposite last page

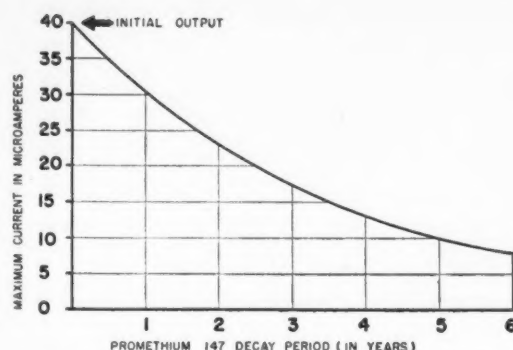


Chart indicates life span of nuclear battery. Five year life span is based on device using at least 10 microamperes

volt, total power remaining unchanged.

Although not yet commercially available, battery will eventually be used in hearing aids, small portable radios, and civil-defense warning receivers for the home. According to Robert C. Miller, Elgin's manager of physical research, battery will some day be used for an atomic-powered wrist watch which will be as safe as present-day watches with radium-treated dials.

Military high-altitude missile and rocket work, and scientific deep space experiments are additional uses predicted for nuclear battery. Unlike conventional batteries, nuclear battery operates satisfactorily under extreme environmental conditions. At temperatures as low as -200°F , voltage and power output actually increase. At temperatures up to boiling point of water, battery operates with small decrease in power output.

(Information courtesy of Walter Kidde Nuclear Laboratories, Inc., Dept. CP, 975 Stewart Ave., Garden City, L.I., N.Y.)

How companies prepare managers and supervisors for future

Top executives report on their companies' experience in strengthening supervisory and executive performance for future operations in 63-page publication. Subjects such as the necessity for analyzing management's role in our economy with greater depth, programs of executive apprenticeship and development, a psychiatrist's appraisal of executive life — its functions, problems, and hazards — are covered. A report on supervisory job performance studies, and a discussion of integrity in business and its implications for management are also included.

To obtain Personnel Series 167 remit \$1.75 (AMA members \$1.00) direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. When inquiring specify 3311 on form opp. last page.



CAMCO

STAINLESS STEEL PIPE FITTINGS

Camco specializes in the manufacture of stainless steel pipe fittings and this specialization has resulted in a quality product at no premium in price.

SCREWED FLANGED WELDING

One source for all your Stainless Steel Fitting Requirements

FILL IN AND
MAIL TODAY —

FREE!

CAMCO Products, Inc., 445 State Street
North Haven, Conn.

Gentlemen: Please Send —

- ☐ Catalog covering complete line
- ☐ Flange Dimensional Slide Rule
- ☐ Furnish address of area distributor

Name _____

Company _____

Address _____

City _____ State _____



PRODUCTS, INC.

445 STATE STREET
NORTH HAVEN, CONN.

When inquiring check 3312 opposite last page

for more accurate chemical feed
control at LOWER COST use a...

"Packaged" NEPTUNE CHEMICAL FEED UNIT

**JUST PIPE-IN . . .
PLUG-IN . . . AND OPERATE!**

You'll get positive, accurate proportioning of chemicals when you use a NEPTUNE "packaged" chemical feed unit. That's because tank, agitator and pump are designed and built into one precisely-engineered chemical feed system. In addition to lower first cost and minimum upkeep, longer life is assured by 316 stainless steel construction of all wettable pump parts.

- simply designed pump can be regulated easily to proportion exact quantities of chemical continuously
- agitator keeps precipitates from settling, assuring constant solution strength
- Y-type strainer removes harmful solids, prevents pump damage

Write, wire or call for additional details and let us bid on your requirements.

NEPTUNE PUMP MANUFACTURING CO.
chemical proportioning pumps
and sump pumps

4912 NORTH 6TH STREET
PHILADELPHIA 20, PA.
phone: Michigan 4-4983

When inquiring check 3313 opposite last page



Tank, agitator and pump are combined in one smooth operating system that precisely proportions anything from treating chemicals, such as calgon, to petroleum distillates.

What's A "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

IDEAS

No more sodium reactors for naval vessels

The Atomic Energy Commission has shut down the operation of the prototype Submarine Intermediate Reactor (SIR) at West Milton, New York. The reactor plant is the prototype of the nuclear propulsion system used in the submarine Sea-wolf. The announcement followed a statement by the Department of Defense that it does not plan to install sodium-cooled reactor propulsion systems in any other naval vessel. Developed at the Knolls Atomic Power Laboratory, the SIR had been operating experimentally since May, 1955.

(Information courtesy US Atomic Energy Commission, Dept. CP, Washington 25, D.C.)

Handbook aids in selection of industrial equipment

Illustrated handbook of 24 pages contains detailed specifications and descriptive data on line of office and factory equipment. Included are such items as shelf trucks, lockers, small parts cabinets, hand dryers, fireproof blueprint cabinets, and glass-door display cases.

"Handbook of Industrial Equipment" is issued by General Industrial Co., Dept. CP, 5736X Elston Ave., Chicago 30, Ill. When inquiring specify 3315 on form opposite last page.

Covers various equipment for environmental tests

Various types of environment-simulation equipment, made to meet special test requirements, are presented in four-page brochure.

"Equipment for Simulation of Environments on or Above the Earth" is issued by Mantec, Inc., Dept. CP, 126 Maryland St., El Segundo, Calif. Specify 3316 on form which is located opposite last page.



RUGGED
but
extremely
SENSITIVE!

PARTLOW TEMPERATURE CONTROLS are built to withstand rough usage, but they're also extremely sensitive to slightest temperature changes. They'll take a lot of punishment without upsetting their accuracy and precision.

If your process requires precise temperature control in the -30°F to 1200°F range, you can do it better . . . and at lower cost . . . with Partlow Controls.

They're less complicated than thermocouples. Thick-walled capillaries and seamless tubing assure almost indefinite life. Elements can be replaced on the spot.

What's your control problem?
Tell it to Partlow!



MODEL RS
Recording Temperature
Control

Ask for Partlow's
Condensed Catalog

partlow

the pioneer in mercury thermal controls

THE PARTLOW CORP., Dept. P-557 NEW HARTFORD, N.Y.
Offices in All Principal Cities

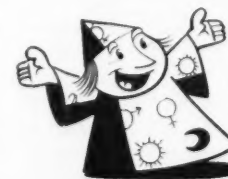
When inquiring check 3317 opposite last page

METHANOL

If you evaporate Methanol in the production of films, plastics or artificial leathers, you can recover it for only 6¢/gal.—the direct operating cost of a Barnebey-Cheney Automatic Solvent Recovery System.

Similar savings are possible with all common solvents, which can readily amortize your investment in recovery equipment.

For complete details, write
for free Bulletin 821-62.



Activated Charcoal is the modern Alchemist that transforms waste vapors into useable solvents.

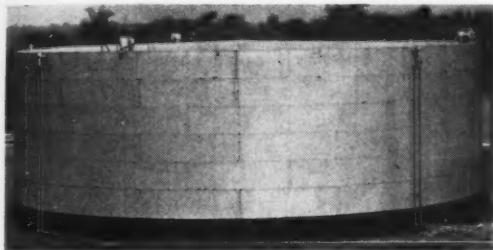
ACTIVATED CARBON
Purification & Recovery Equipment
BARNEBEY-CHENEY

CASSADY AT EIGHTH COLUMBUS 19, OHIO
Los Angeles • San Antonio • St. John's, Quebec

When inquiring check 3318 opposite last page

**Oil evaporation losses cut 50 percent
by use of tiny plastic spheres
in storage tank**

Results of a two year test at Sinclair Refining Company, Houston, Texas, indicate that evaporation losses in oil storage tanks can be cut 50 percent by the use of tiny plastic spheres. The spheres, known as Microballoons, are about one one-thou-



Test was made in 80,000-bbl cone-roof storage tank

sandth the size of a ping pong ball. They were developed by the Standard Oil Company of Ohio. Made of Bakelite phenolic resins, they pack together on the surface of oil to form a continuous vapor barrier that resembles a layer of wet fudge.

Sinclair installed a 1/2" layer of spheres in one of its 80,000-bbl cone-roof storage tanks. As in all working tanks, the oil level rose and fell several



The tiny plastic spheres pack together on surface of oil to form a continuous vapor barrier

times a month as oil was pumped in or out. When the level rises, vapors collecting above crude oil are forced out of vents in cone roof and are lost to the surrounding atmosphere.

Careful analyses were made of these vapors during days in both summer and winter while tanks were filling. On the basis of these analyses it was calculated that the evaporation loss from the tank with the layer of Microballoon spheres was about half that of the control tank which had no vapor seal.

(Microballoon spheres are manufactured and sold under license by Bakelite Co., a Division of Union Carbide and Carbon Corp., Dept. CP, 260 Madison Avenue, New York 16, N.Y. . . . or for more information check 3319 on form opposite last page.)

**THERE'S A BRIGHT, FINE GRAINED FUTURE FOR
BUFFING COMPOUNDS**

**made with SWIFT'S
DOUBLE PRESSED
STEARIC ACID**

A good bench mark of Swift's Stearic Acid quality is found in its acceptance as a good basic material for the manufacture of buffing compounds.

Freedom from foreign materials and ability to resist high frictional heats are paramount in good buffing compound. Smooth surface finish and fine grained work depend upon predictable, uniform transfer of compound from "block" to stick, to wheel, to work-piece. Swift's unique *Solexol* process for fractionating and refining double pressed stearic acid retards lime soap formation in preparation of lime buffing compounds.

The characteristic purity, heat, odor and color stability that is specified for Swift's Double Pressed Stearic Acid is available—to your specifications whether you make crayons or candles, lipsticks, lathers or lotions. Swift's unique low temperature solvent process helps to make selective extraction a reality. And it helps provide Swift customers with a variety of versatile, dependable stearic acids that will fit specific needs at a price to fit the job.

A trial will tell. Write for information on a trial order today and remember...



WRITE FOR THIS FOLDER

Shows how Swift's Stearic Acids compare on basis of color, heat and freshness stability tests with 6 similar products.



To Serve Your Industry Better

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

SWIFT & COMPANY, Technical Products Dept., 1830 165th St., Hammond, Ind.

<p><i>Mail the coupon Today</i></p>	<p>Swift & Company, Technical Products Dept. 1830 165th Street Hammond, Indiana</p>
	<p>Please send details on trial order of Swift's Stearic Acid for Send Stearic Acid Bulletin</p>
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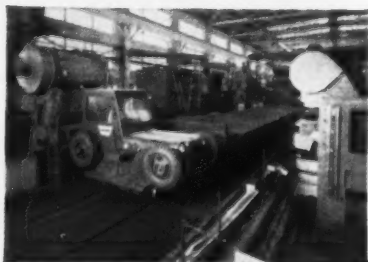
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Road to Rail "Convertible"

speeds production, saves money



From receiving to shipping, material for every Verson Press moves through production on cars pulled by Trackmobile.



SEND FOR
"7 Steps To Lower Costs",
an illustrated performance
report on Trackmobile
at Verson.



3 moves a day make it pay

Verson Allsteel Press Company, Chicago, reports that their Whiting Trackmobile plays an important part in the flow of production. It moves a minimum of 100 cars a week ... pulls loads as high as 500,000 pounds ... works as much as 24 hours a day. It is never bottled up because it converts from road to rail in seconds ... ready to haul, switch and spot.

Hundreds of companies profitably use Trackmobile with as few as three car moves a day. Plant efficiency goes up because workers no longer stand idle waiting for a switch engine to serve a jammed siding. Look to the Trackmobile now ... speed production ... cut costs!

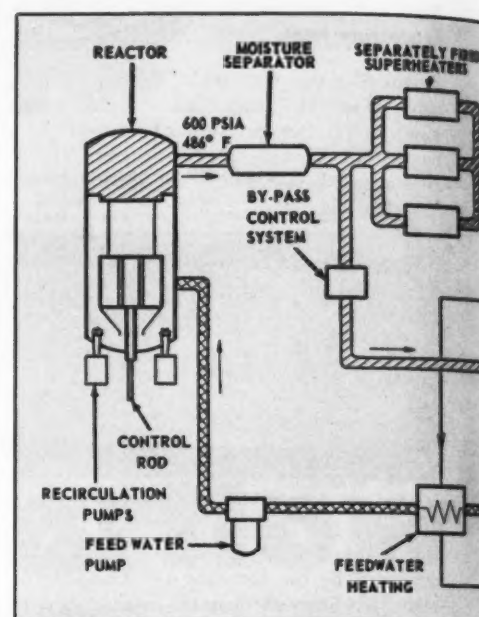
WHITING CORPORATION

15667 Lathrop Avenue, Harvey, Illinois

MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILE, FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

When inquiring check 3321 opposite last page

ideas — from other industries and nuclear field
... new trends in research, processes, services



Things are moving fast in the nuclear power field — another full-scale plant is scheduled for construction, making a total of 19 being planned in the US. This one will be the first to use a ...

controlled recirculation

Plans have been announced by a group of mid-western utility companies to construct a 60,000-kw nuclear power plant. Subject to the approval of the Atomic Energy Commission, the plant will be built on a site (yet to be picked) along the transmission system of the Northern States Power Company, which would operate the plant. Installation will cost an estimated 20 to \$25 million. It should be completed by 1962.

Heart of the plant will be an advanced type of nuclear power reactor — a controlled recirculation boiling reactor (CRBR). Big feature is its high energy output per unit of volume. The cylindrical core, measuring 5x5', will generate 133 megawatts of heat — as much as a conventional boiler burning 20 tons of coal an hr.

Reactor will operate at 600 psi. Heat from the nuclear reaction will boil water to produce 488°F steam. Steam will flow through superheaters on its way to the turbine, boosting it to 1000°F at 540 psi. Superheaters will be fired with conventional fuel. Main difference between this reactor and the experi-

CHEMICAL PROCESSING

HOW TO OBTAIN

greater throughput

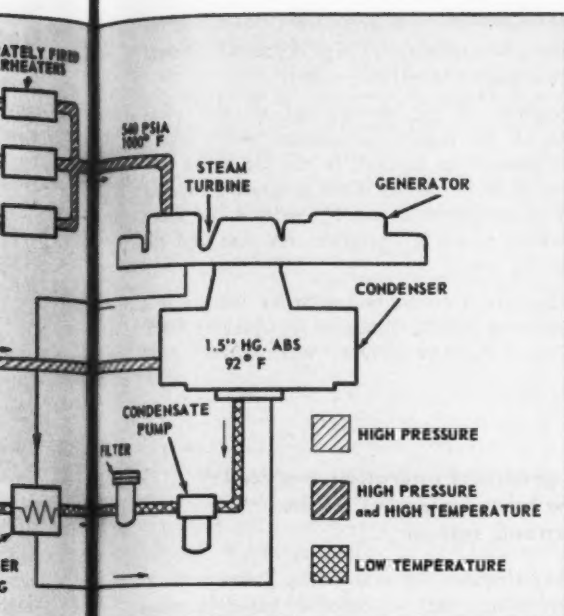
IN SCRUBBING OPERATIONS

Greatest throughput in scrubbing operations is obtained at a balance point where maximum wetting of the packing occurs without flooding the tower. Maximum wetting involves a higher liquid hold-up.

Intalox saddles pack with greater randomness, form a loosely packed, yet tightly interlocked bed free from blocked areas, with higher surface area, and what is especially important, as far as throughput is concerned, provide a bed of greater and more uniform voidage.

As a result it is possible with Intalox saddles to have a higher liquid hold-up than with other packings yet still retain the low pressure drop characteristics of Intalox since the higher liquid hold-up results from a greater wetted-surface-area rather than from liquid-filled voids.

This ability to give higher liquid rates without flooding is reflected in substantially better mass transfer performance.



Big feature of controlled recirculation boiling-water reactor is its high energy output-per-unit volume. Reactor's 5x5' core will generate 133 megawatts of heat

ion boiling reactor

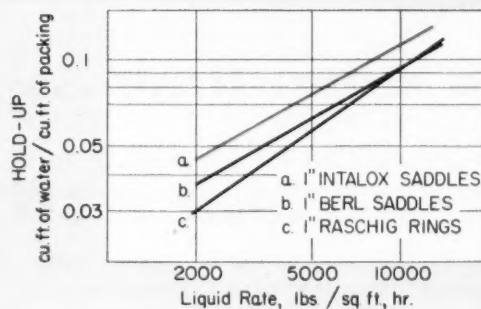
mental boiling water reactor (EBWR) at Argonne (see *CHEMICAL PROCESSING*, April 1957, p. 14) is that the reactor power can be adjusted by controlling the rate of water recirculation through the reactor core. This is accomplished by large pumps located at bottom of the reactor. If greater steam output is desired, speed of the pumps will be increased automatically. This will cause additional steam to move out of the core, boosting the power level. If power demand decreases, pumps will slow down. It is believed that the new design will make a significant contribution toward bringing the cost of electric power from atomic energy into a more competitive position.

Reactor vessel will be 9' in diam and 23' high. It will be housed in a steel-and-concrete building 45' in diam by 70' high. The steam turbine-generator unit will be housed in a conventional-type building. Turbine-generator will be similar to the one at Argonne, but will have a much greater generating capacity.

Boiling-water reactors similar to the CRBR have

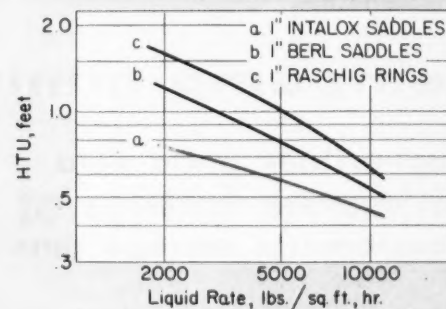
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Fig. 1—HOLD-UP DATA



Higher liquid hold-up of Intalox Saddles reflects the better accessibility of the packing surface to liquid, thus greater wetted-surface area. Voids remain open, pressure drop low.

Fig. 2—HTU DATA



The capacity data shown are typical for a system where both gas and liquid film resistances are involved. Lower HTU values mean shorter towers, less pressure drop and reduced initial investments.



Write for this free booklet:

Bulletin S29-R gives full technical data on Intalox Saddles, performance charts, typical problems and solutions. Address: Dept. CP557 U. S. Stoneware, Akron 9, Ohio.



U. S. STONEWARE

AKRON 9, OHIO

481-E

When inquiring check 3322 opposite last page



Chempump minimizes downtime...

pumping bulk nitric acid from delivery truck to customer's storage tank

The *Chempump* mounted on this truck can't possibly leak.

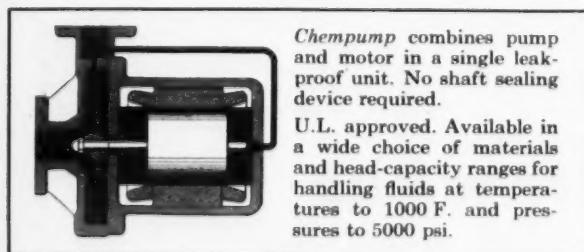
For Pressure Vessel Service, Detroit, this simple fact means a considerable saving in truck downtime and maintenance in the delivery of 63% nitric acid to electroplating plants.

The conventional pump formerly used on this truck persistently leaked acid through its stuffing box. The company faced expensive repair or replacement of the

acid-corroded truck bed. Pump maintenance was a continual, bothersome expense. Truck downtime was becoming a serious and costly problem.

Now, with a *Chempump* on the job, leakage is eliminated and maintenance is limited to a simple monthly inspection of pump bearings. No external lubrication is needed—bearings are constantly lubricated by the pumped fluid itself.

In any chemical handling application, *Chempump* offers many major advantages. You'll do well to check them. Write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump
First in the field...process proved

When inquiring check 3323 opposite last page

IDEAS

Boiling Water Reactor

(Continued from preceding page)

been proved to possess a very high degree of inherent safety (see page 156 of this issue).

Announcement of the construction of this plant brings to 19 the number of nuclear power plants presently planned to be built in the US at an estimated cost of \$675 million. Total generating capacity for these plants will be almost 1½ million kw. Three are scheduled to be in operation this year and the remainder by 1962.

(Controlled recirculation boiling-water reactor is a development of Allis-Chalmers Manufacturing Company, Dept. CP, Milwaukee 1, Wisconsin.)

Steam generator operation analyzed in a few hours instead of weeks by electronic system...

sensing elements linked to analog scanners quickly probe hundreds of different boiler locations

An electronic system has been developed to help engineers determine quickly and economically such boiler problems as sources of heat losses, most efficient types of fuels, and when and where to remove combustion waste deposits. The system can analyze



Brain of system is a centrally-located electronic coordinating unit

the operation of a large steam generating unit in a matter of hours — a job ordinarily requiring weeks by a team of specialists. By reducing the number of personnel required to do the job, the system also conserves engineering manpower.

Brain of the system is a centrally-located electronic coordinating unit developed by the Babcock & Wilcox Company. A special scanning device designed by The Bailey Meter Company, Cleveland, Ohio, makes it possible to gather data from widespread points of a boiler. Each scanning unit collects information from 25 different sensing elements. Any number of these devices may be hooked up with the system, depending on the quantity and location of points from which information is desired.

At a touch of a button, the system begins gathering such data as temperature, pressure, and gas composition. This information is then automatically sorted, supplemented with pre-set figures, and punched in code on continuous tape. Tape readings are then transmitted to an electronic computer where they are automatically processed and transmitted back to the boiler site for application.

(Information courtesy of Babcock & Wilcox Co., Dept. CP, 161 East 42nd Street, New York, N.Y.)

Book cites need for technicians, tells how to become one

Technicians hold a key spot between the engineer and craftsman in industry. Emphasizing the important role and promising futures in this comparatively new occupation, 32-page booklet states that an average of between five and seven technicians are needed immediately for each professional engineer in all areas of industrial research, development, and production. Designed especially for guidance of junior and high school students to encourage them to enter the technical fields, the booklet contains detailed descriptions of the work and qualifications needed to be a technical specialist in nine specific categories.

"Your Opportunities in Industry as a Technician" is issued by National Association of Manufacturers, Dept. CP, 201 N. Wells Street, Chicago 6, Illinois. When inquiring specify 3324 on form opposite last page.



"Plant expansion's your baby . . . I've got my own problems!"



Mr. Henry Backus
PERSONNEL & SAFETY DIRECTOR
Midwest Abrasive Company
Owosso, Michigan



"Doc! It's like fighting DERMATITIS with an armored glove."

Except WEST protective gloves are invisible:

- quickly applied
- comfortable to wear
- easily washed away.

For skin exposed to oils, dust, grease and grime:

- use PROTECTIVE CREAM #211.

For skin exposed to acids, alkalis and inorganic chemicals:

- use PROTECTIVE CREAM #311.

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WEST PROTECTIVE CREAMS protect against hundreds of troublesome industrial irritants. They're antiseptic. Inhibit harmful bacteria with Hexachlorophene. And they protect for extended periods of time.

"We've found a simple way to control dermatitis"

"Our men all know how West's Antiseptic Protective Cream #211 guards their hands against abrasive dusts and other potential skin irritants in our plant. Applying this protective cream regularly has become a simple routine with them. As a result, this precaution has virtually eliminated outbreaks of dermatitis," says

MR. HENRY BACKUS, Personnel & Safety Director for the Midwest Abrasive Company, Owosso, Michigan.

"We find that West's Antiseptic Protective Cream #211 does not harm or stain clothing and may be used around the year in complete comfort."

Would a similar program interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD



WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N.Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

- ☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
- ☐ Please have a West representative telephone for an appointment.

Name

Position

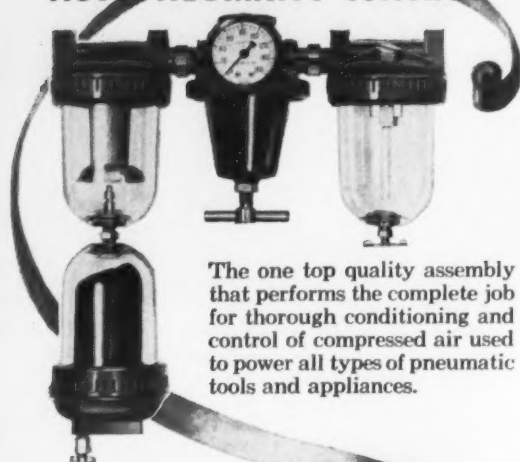
Mail this coupon with your letterhead to Dept. 24



When inquiring check 3325 opposite last page

ARROW

AUTOPNEUMATIC CONTROL



The one top quality assembly that performs the complete job for thorough conditioning and control of compressed air used to power all types of pneumatic tools and appliances.

The AUTOPNEUMATIC CONTROL ASSEMBLY features...

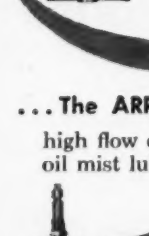
...The ARROW FILTER

high flow capacity with filtration as required and low pressure drop.



...The ARROW REGULATOR

high flow capacity with positive pressure control.



...The ARROW LUBRICATOR

high flow capacity with correct oil mist lubrication.



...The ARROW AQUAMATIC DRAIN TRAP

automatically disposes of collected moisture from filter with no loss of compressed air.

Assemblies and separate units supplied in pipe line sizes from 1/4" NPT through 2" NPT.

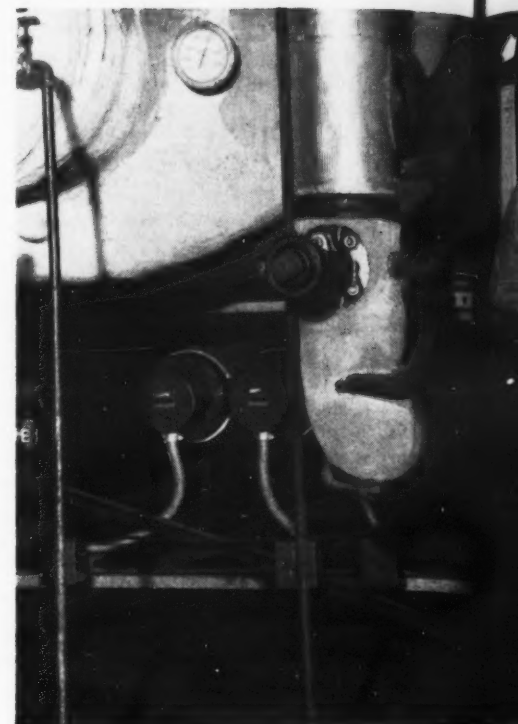
QUALITY PRODUCTS SINCE 1914

Catalog and engineering data on request.

ARROW TOOLS, INC.
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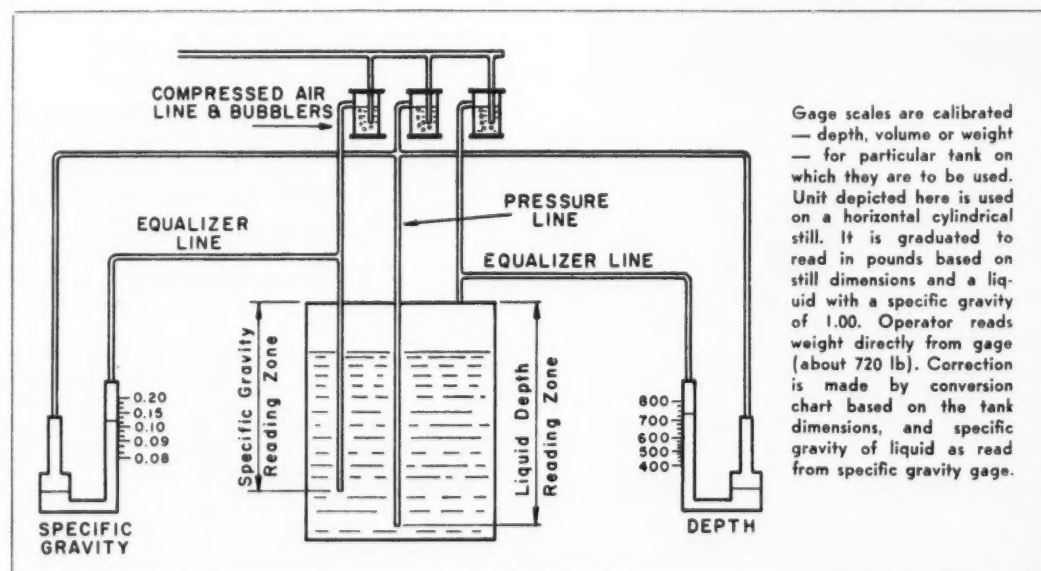
instrumentation & control

Operator records level and specific gravity readings. Gages (arrows) provide a continuous indication of these variables during resin distillation



Gage glasses on resin stills at Pennsylvania Industrial Chemical Corp. clogged and were potential safety hazards. Accurate blending of ingredients in stills was not possible. Now a combination of depth and specific gravity gages permits...

blending in stills under vacuum...



Gage scales are calibrated — depth, volume or weight — for particular tank on which they are to be used. Unit depicted here is used on a horizontal cylindrical still. It is graduated to read in pounds based on still dimensions and a liquid with a specific gravity of 1.00. Operator reads weight directly from gage (about 720 lb). Correction is made by conversion chart based on the tank dimensions, and specific gravity of liquid as read from specific gravity gage.

When inquiring check 3326 opposite last page



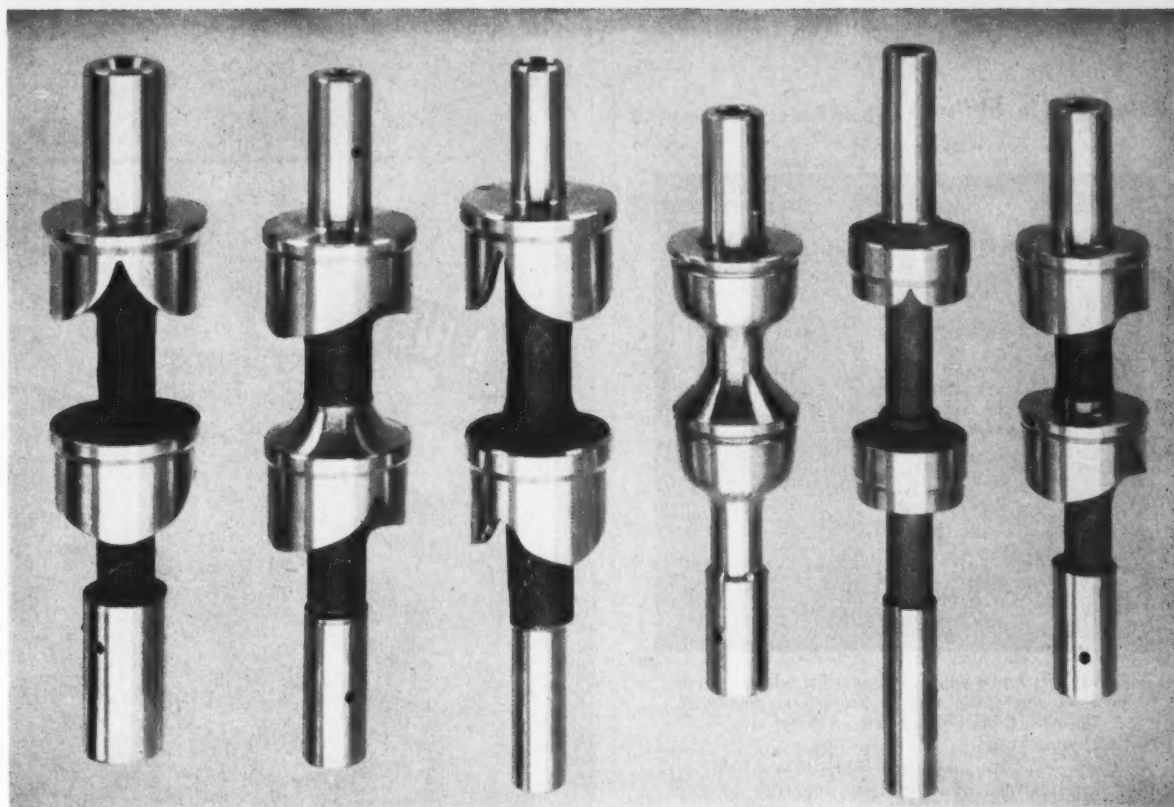
m... accurately, safely

THEODORE W. WETT, Assistant Editor

With WILLIAM D. JOHNSTON, JR., Chief Engineer
Pennsylvania Industrial Chemical Corp., Clairton, Pa.

Problem: Increasing viscosity of resin caused gage glasses to become inoperative during distillation of hydrocarbon resin at Pennsylvania Industrial Chemical Corp. Glasses were also a hazard because breakage threatened either a spill or introduction of air into still at high temperatures, with concurrent possibility of fire or explosion. Depth of liquid could be determined by closing down still and measuring with a stick gage. However, this was time-consuming and did not allow any calculation of final still-charge weight since specific gravity was not known. Weight of finished resin could only be determined accurately by pumping product into drums which were then weighed.

Final products are permanently thermoplastic and
(Please turn to next page)



Inner secrets of inner valves

FACTS EVERY CONTROL VALVE USER SHOULD KNOW

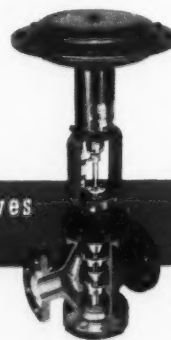
This is a rare photograph . . . presented in a completely unretouched form. It shows the inner valve of leading makes of diaphragm control valves. The inner valve determines the control result.

The most amazing fact is the size . . . all are listed as two inch valves. All are high lift. But compare them.

Note the KIELEY & MUELLER inner valve at the far left. It equals the others on every point of con-

sideration; exceeds on many. Look at the diameter across the skirt . . . that's one reason for the remarkable C_v of K&M valves. Look at skirt length; the solid, not fabricated, design. Measure the rugged guide posts and the large column. Examine the machining and the super-finishing.

It's no wonder . . . K&M is the valve that likes to be compared. It's a better valve and a better value by every measure of comparison.



FOR THE COMPLETE FACTS . . .
write for the K&M Valve Engineering Data Catalog, Bulletin CV53.

diaphragm control valves

K&M

Our 78th Year

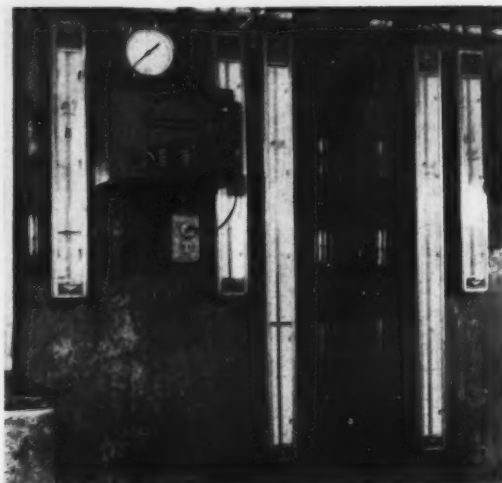
KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer
64 Genung Street, Middletown, New York

When inquiring check 3327 opposite last page

Blending in Stills

(Continued from preceding page)



Portion of depth gages and specific gravity gages used on eight resin stills at Pennsylvania Industrial Chemical Corp. Stills operate at 26" of vacuum

find application in protective coating, flooring (asphalt tile binder), and adhesives. Using gage glass system, accurate reproducible blending-in of various ingredients required to produce desired end-products was not possible. Some ingredients could not be satisfactorily measured by displacement meters; it was not possible to determine weight of material added. Therefore, blending had to be done separately.

Coumarone-type resins, as produced here, are catalyzed in a solvent matrix and distilled. Purpose is to obtain product with desired melting point and remove non-reactives including saturates, aromatics, and solvents. Distillation is carried out at temperatures up to 250°C, depending on product, under a 26" vacuum.

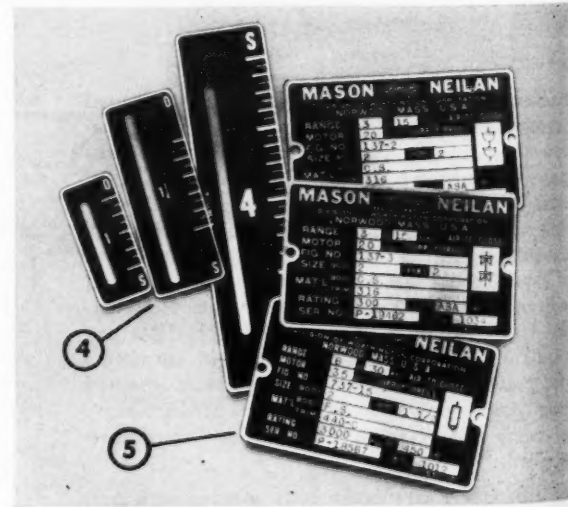
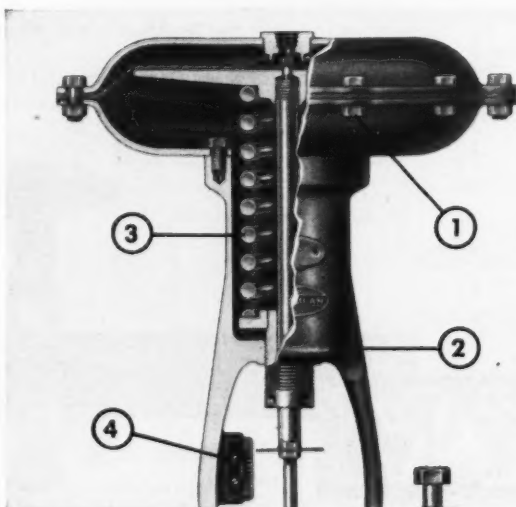
Batch charge ranges from 35,000 to 85,000 lb (4000 to 10,000 gal). Weight is reduced about 50% during distillation. End point is determined by drawing sample and checking softening point. Specific gravity ranges from 0.85 to 1.15 during operation.

Solution: About five years ago Pennsylvania Industrial Chemical installed a combination of specific gravity indicator and depth gages on eight resin stills.

Specific gravity gage operates on principle of differential bubbler. Two downpipes are installed in still, one a predetermined distance (12 in) above the other. Longer pipe is connected through pressure line to high-pressure (indicating-liquid well) side of U-tube gage. Shorter pipe is connected through an equalizer line to low-pressure side (top of indicating glass tube). Pressure created by height of liquid resin in still against air in



(1) Bolted diaphragm case assures tightness, offers no pockets to accumulate moisture, permits use of flat stock diaphragms in emergency. (2) Cast iron yoke provides inherent rust resistance and rigidity — cannot get out of alignment. (3) Standard 6-30 psi range springs available (at no extra cost) for easy interchangeability with 3-15 psi range. (4) Stroke scale shows actual increments of plug travel. (5) Full specification data on serial plate gives complete information at a glance.



Masoneilan Control Valves Pioneer in Design To Cut Downtime!

Practical Engineering Builds In Features to Speed Servicing, Reduce Time Losses

Practical engineering aims at reducing maintenance to a minimum and speeding unavoidable servicing. That's one reason Masoneilan Valves find such widespread acceptance — they combine the economies of long life, low service costs and minimum downtime.

Mason-Neilan pioneers many high C_v design features with the *maintenance man* in mind — making his job simpler and more speedily accomplished. Consider, for example, these ten ways in which proper design

helps save important money. And for the full story on the complete line ask the office nearest you — or write

MASON-NEILAN

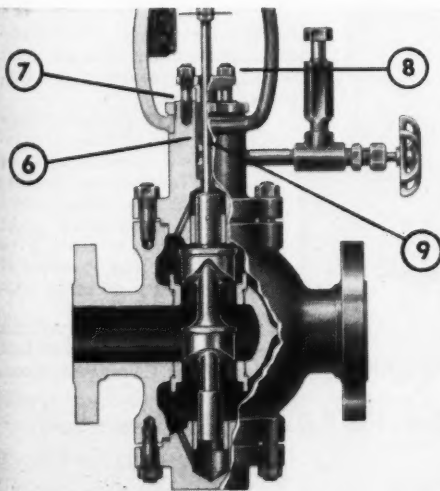
Division of Worthington Corporation

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Birmingham • New Orleans • Seattle
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

(6) Split-ring, preformed packing assures long service, ease of replacement. (7) Motor is easily removed from bonnet without disturbing packing box. (8) Bolted packing box assures maximum seal with minimum friction; provides visual check on packing life. (9) Superfinished stems move freely, reduce packing box friction, increase packing life. (10) Interchangeability of trim parts assures accurate fit of replacements, speeds conversion for change of process.



downpipe is transmitted through pressure line to indicating liquid. Pressure forces indicating liquid down in well and up in previously calibrated glass tube where reading is taken.

When level in tank is above lower end of short downpipe, rise of gage liquid will be limited by equalizer line pressure just as though tank were filled only to depth reached by short pipe. Thus gage measures pressure created by weight of liquid between ends of the two pipes.

Compressed air lines maintain a constant flow of air to each downpipe through a bubbler system. Since this flow of air is constant, any variation in rise of gage liquid will be caused only by changes in specific gravity of resin.

In depth gages a single downpipe is used with equalizer line connected to top of still to form a closed system permitting operation under any condition of pressure or vacuum. A bubbler system feeds a constant supply of air to both lines to expel any liquid from bottom of downpipe or vapors from equalizer line, and establish correct tank datum as in the specific gravity gage.

Results: Gage system provides continuous indication of liquid level and specific gravity during distillation. An accurate final weight of finished resin can be determined. Accurate reproducible blending of various ingredients in the stills under vacuum is now possible. Gages have been in continuous service, supplying accurate data, since installation more than five years ago.

Danger of spills or fires has been eliminated.

(Depth and specific gravity gages were supplied by King Engineering Co., Dept. CP, Ann Arbor, Mich. . . . or for more information check 3329 on form opposite last page.)



Thanks to S. J. Martinez, Dowell Incorporated, Tulsa, Okla.

When inquiring check 3328 opposite last page

Add flexibility to your machines with low-cost speed control



Choose from 8 sizes . . . 1/4 to 15 hp . . . 1.75:1 to 4:1 speed ratio. Converts any standard constant-speed motor into variable speed drive.

MAXIMUM TO MINIMUM OUTPUT SPEED POSITIONS

REEVES® Vari-Speed Motor Pulley

✱ Get greater productivity . . . run at the most economical production speed . . . handle production or process variables with the same machine—install low-cost REEVES Vari-Speed Motor Pulleys!

Change machine output speeds . . . instantly and accurately . . . without interrupting production. Positive "close-grooving" lubrication assures free sliding discs for easy, sure speed adjustment. Minimum parts mean long, trouble-free service.



Write today—CP29a-V545; we'll send your copy of the Motor Pulley bulletin complete with rating data and dimensions.

REEVES PULLEY COMPANY

Division of **RELANCE ELECTRIC AND ENGINEERING CO.**
Columbus, Indiana

When inquiring check 3330 opposite last page

INSTRUMENTATION

**Defines types of computers,
summarizes applications**

What are virtues of analog computers over digital? What are relative accuracies, physical sizes, and power requirements of high-speed and real-time computers? What are typical fields of application for high-speed computers? How do manufacturer's computers provide repeatability of solution and solution readout? These are some of the questions answered in simple terms in eight-page booklet. Comparisons between analog computation and fields of photography and genetics are included.

"High-Speed Analog Computers, Key to Rapid System Development" is issued by GPS Instrument Co., Inc., Dept. CP, 811 Boylston St., Boston 16, Mass. When inquiring specify 3331 opposite last page.



Micro-control valves

. . . with low hysteresis have been developed for laboratory and pilot plant use. Features include low initial cost, simple construction for easy assembly or repair, and a wide range of control pressures from 6 cu ft air at 10 psi to 800 psi. Valves are air-operated and have Teflon packing.

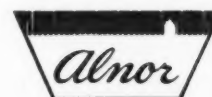
(Micro-control valves are product of Modern Manufacturing Company, Dept. CP, Box 367, Bartlesville, Okla. Check 3332 on form.)

READ any surface temperature with **Alnor** PYROCON

Equipment...material...metallic or non-metallic...flat, curved... revolving or stationary—you can read every surface temperature accurately in less than 3 seconds!

Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



**PRECISION INSTRUMENTS
FOR EVERY INDUSTRY**

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ASKANIA

Positive Displacement Transometers

For Measuring, Controlling, Indicating, Integrating Flows of Fuel Oils, Viscous Liquids and other Liquids.

The Askania Transometer is a Positive Displacement Flow Meter that also sends a pneumatic signal for flow indication, recording and controlling functions.

Positive Displacement spells the difference between conventional flow meters and the Askania Transometer. Positive Displacement is the ONLY means for accurate measurement under ALL conditions of flow. Even changes in viscosity, pressure or temperature have no effect upon Transometer accuracy. Write for bulletin 301 to Askania Regulator Company, 242 East Ontario Street, Chicago 11, Illinois.



ASKANIA REGULATOR COMPANY

"CONTROLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS,
ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A SUBSIDIARY OF

When inquiring check 3334 opposite last page

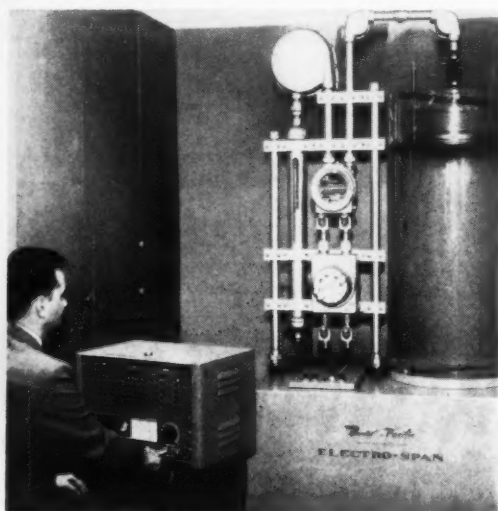
CHEMICAL PROCESSING

**Relieves need for operators
at distant tank-farms . . .**

remote-control and measuring system uses
standard plug-in assemblies

Uses: As remote-control system of telemetering (measuring and monitoring at a distance) to eliminate need for operators of chemical processes. Instrument can also be used to eliminate need for supervisors at remote tank-farms or other installations where it is desirable to separate a human supervisor from device or installation being supervised.

Features: Remote-control system consists of standard plug-in assemblies which can be organized to perform specific tasks according to installation requirements.

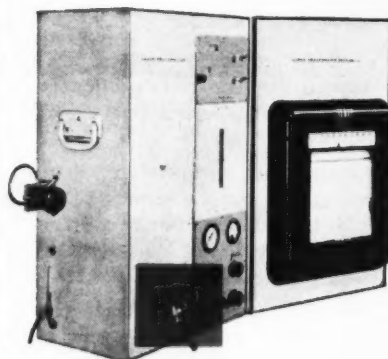


Remote control techniques used in guided missile development permit remote operation of tank-farms

Description: System includes a digital pressure-gage for measuring and indicating pressure, tank-gage transmitter for transmission of temperature and level information, shaft-position controller, various "read-out" devices ranging from type-writers to lamp systems. System is available in two models. One is a simultaneous frequency code system utilizing voice bandwidth, as telephone lines. Other is a sequential pulse code system for telegraph circuits.

Typical installation will use electronic signals transmitted by radio and telegraph lines to check liquid level in storage tanks. System will then turn valves and start pumps to feed correct amount into pipe line or process while computers automatically record and check what's going on.

(Electro-Span control system is product of Pacific Division, Bendix Aviation Corporation, Dept. CP, 11600 Sherman Way, North Hollywood, Calif. . . . or check 3335 on form opposite last page.)



**how big
can a
small valve
be?**

Take this Hoke needle valve for instance...it looks pretty small on the front panel of Perkin-Elmer's new vapor fractometer, but it looks *big* in the eyes of the man who's buying or making equipment like this. Just a handful of brass? That's so, but carefully fashioned to control up to 3000 psi with no strain! It's added evidence of careful engineering.

Whether you're the man who makes high quality test equipment or the man who uses it, we'd like to prove to you how *big* Hoke valves can be. There are valves in the Hoke line for hydraulic and pneumatic equipment; for instrument panel or test stand use; for pilot plants . . . Forged needle valves (like the one shown), bar stock valves, packless valves and toggle valves. May we send you a catalog? See us at

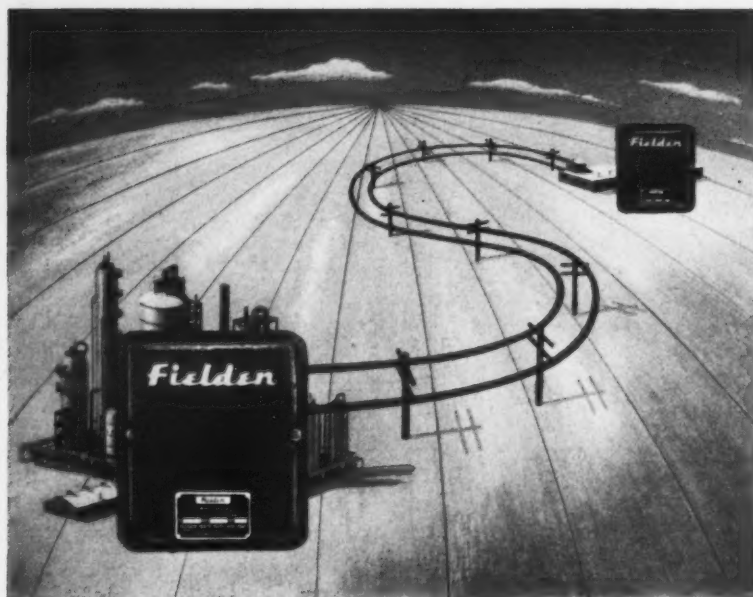
DESIGN ENG. SHOW
N.Y. COLISEUM, MAY 20-23



HOKE, INCORPORATED, FLUID CONTROL SPECIALISTS, 145 S. DEAN ST., ENGLEWOOD, N. J.

When inquiring check 3336 opposite last page

Transmit Air Signals 5 MILES As Accurately As 1 Foot



Completely new in concept, the Fielden P-E-P Transmission System not only brings speed and accuracy to remote pneumatic transmission but actually promises to revolutionize pneumatic process instrumentation. Now, with hardly any air lines, you can reproduce air signals up to 5 miles away . . . eliminate transmission lag . . . use pneumatic or mechanical sensing elements . . . and even obtain electrical meter readings between transmitter and receiver.

The Fielden P-E-P System makes this possible by converting any pneumatic signal (from 3 to 15 psi) to 3 to 15 milliamperes D.C. for transmission. It then reconverts the electrical signal to the original pneumatic signal, and feeds it to pneumatic instruments or control devices.

WRAP UP TEMPERATURE AT **Fielden**



Whatever the temperature problem, Fielden offers a wide range of solutions. Recorders: from money-saving current or voltage types to null-balance recorders of "building block" design. Controllers: everything from "blind" on-off controllers to recording types with full proportional action. Data Centralizers: automatic scanners, manual monitors, multi-point recorders for up to 96 points. Pyrometry Supplies: full line from sensing elements to chart paper.



Robertshaw-Fulton

CONTROLS COMPANY

FIELDEN INSTRUMENT DIVISION
Dept. G, 2920 N. 4th St., Philadelphia 33, Pa.

Send for
Literature

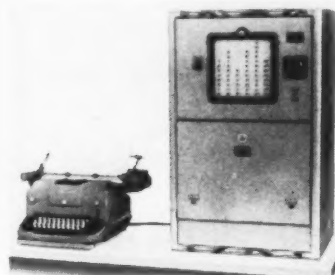
When inquiring check 3337 opposite last page

INSTRUMENTATION

Code telemetering system has servo-writer

Uses: As telemetering system to maintain close control of flow of petroleum products in operation of tank farm, tank-by-tank.

Features: Pulse code telemetering system is equipped with servo-writer to allow data re-



Pulse code telemetering system

cording at predetermined intervals. Instrument also allows automatic scanning until an entire tank farm has been covered.

Description: Pulse code telemetering system has been supplemented with converter equipment to operate a solenoid-actuated typewriter unit.

Liquid level, temperature, date, and time can be reported on each tank. Either spot or average temperature of liquid contents of tank can be recorded.

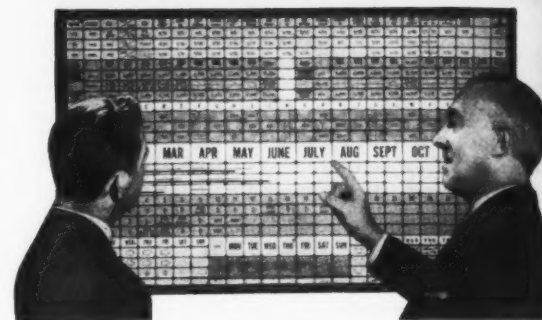
("Varec" pulse code telemetering system with servo-writer is product of The Vapor Recovery Systems Company, Dept. CP, 2820 North Alameda St., Compton, Calif. Check 3338 opposite last page.)

Data on gloss recorder for paper industry

Bulletin of four pages gives detailed description and installation information on dust-compensated, automatic 75° gloss recorder for paper and other products.

Newsletter Vol 4, #19 is issued by Gardner Laboratory, Inc., Dept. CP, Bethesda 14, Md. When inquiring specify 3338A opposite last page.

You Get Things Done Better By Seeing What's Happening



BOARDMASTER VISUAL CONTROL

- ★ Gives Graphic Picture of Your Operations in Color.
- ★ Easy to Use. Type or Write on Cards, Snap on Board.
- ★ Facts at a Glance-Saves Time and Prevents Errors.
- ★ Ideal for Production, Scheduling, Sales, Inventory, Etc.
- ★ A Simple, Flexible Tool-Easily Adapted to Your Needs.
- ★ Compact, Attractive. Made of Metal. 150,000 in Use.

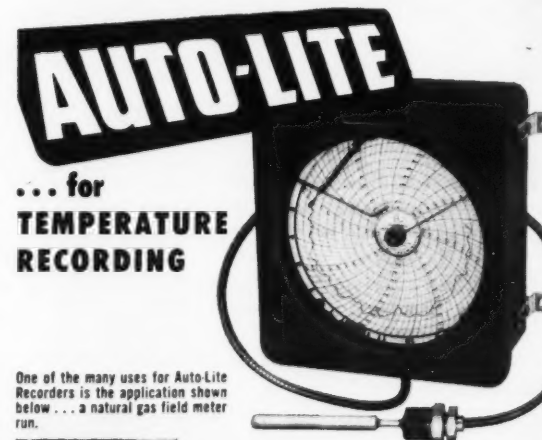
Complete Price **\$49.50** Including Cards

FREE

24-Page Illustrated Booklet AA-50
Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

When inquiring check 3339 opposite last page



One of the many uses for Auto-Lite Recorders is the application shown below . . . a natural gas field meter run.



Auto-Lite Model "1000" Temperature Recorder has 6" chart. Various standard ranges from minus 40° F to plus 550° F. Available for wall mounting, portable or portable self contained use. Electric or mechanical chart drive. Choice of 24-hr. or 7-day cycle. Capillary tubing permits remote reading. Priced as low as \$49.50. Manufactured to customers' specifications. Send for latest Catalog describing many types of Auto-Lite Recorders and Indicators.

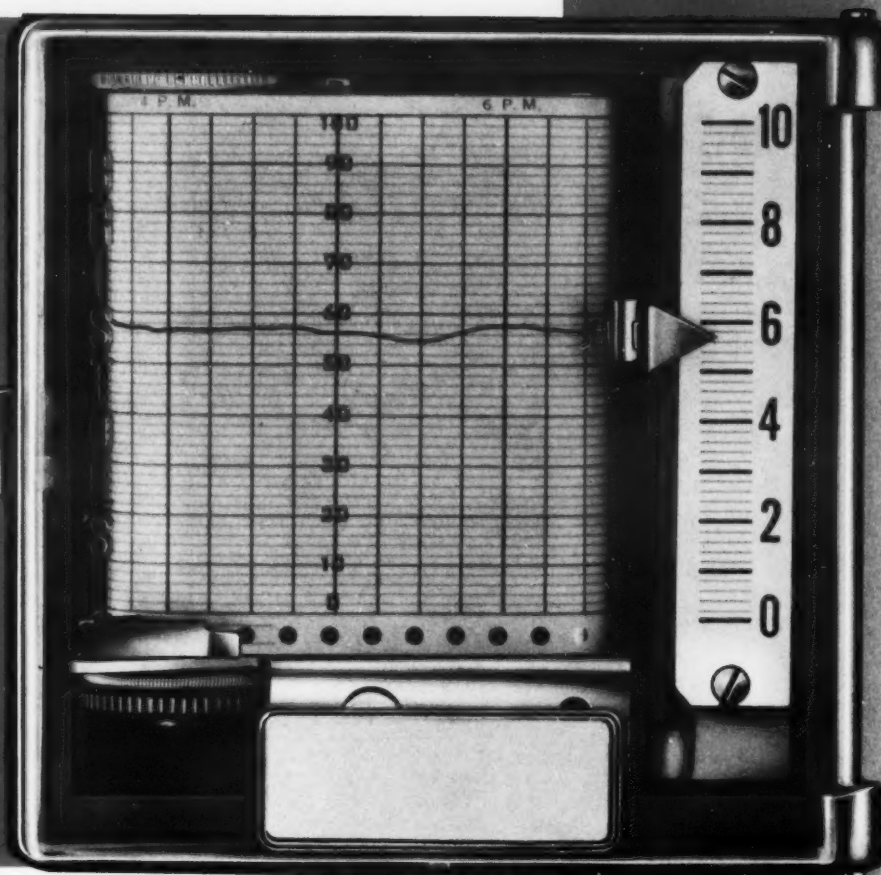
THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE RECORDERS & INDICATORS

When inquiring check 3340 opposite last page

CHEMICAL PROCESSING

Another
BRISTOL
First...



First true motor-driven self-balancing electronic instrument in miniature size!

USES 3-INCH CHART, HAS FULL PLUG-IN FLEXIBILITY!

It's the new Bristol Series 663 Miniature Electronic Dynamaster* Instrument—now available in both indicating and recording models.

No delicate, low-torque galvanometer-type drive unit in this instrument! *The 663 employs motor-driven slidewire self-balancing — the same principle that's been time-proved for superlative accuracy and dependability in full-size Dynamaster instruments.* All in a panel space only 5" x 5 1/8"!

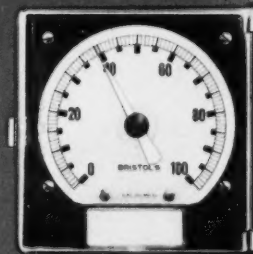
With this advance, Bristol steps ahead on two fronts:

1. Bristol now offers the widest selection of miniature plug-in instruments on the market — electronic, pneumatic, and telemetering (all with the same panel cutout) — you can get them all from Bristol.

2. Bristol becomes the first manufacturer to offer both full-size and miniature instruments in a full line. Your instrument problems get unbiased recommendations from Bristol — every time!

TRADE MARK
BRISTOL'S
REG. U.S. PAT. OFF.

ACTUAL SIZE.
Only 5" x 5 1/8",
mounts on 6 1/8" centers!



SAME INSTRUMENT
also made as an indicator.
See next page.

Turn the page

for features on this exciting instrument development.

CHECK These Features of the new 663 DYNAMASTER... most of them found on no other miniature electronic instrument!

1. **True motor-driven self-balancing operation.** Null-balance mechanism uses high-torque, two-phase motor, *not* galvanometer-type drive unit.

2. **True plug-in chassis.** You can interchange chassis in seconds; thus, you simplify maintenance, remove overhaul to shop where it belongs. Or, you can change from recorder to indicator (or vice versa) just as quickly.

3. **High accuracy.** $\frac{1}{2}\%$ of scale — twice as accurate as ordinary miniature electronic instruments.

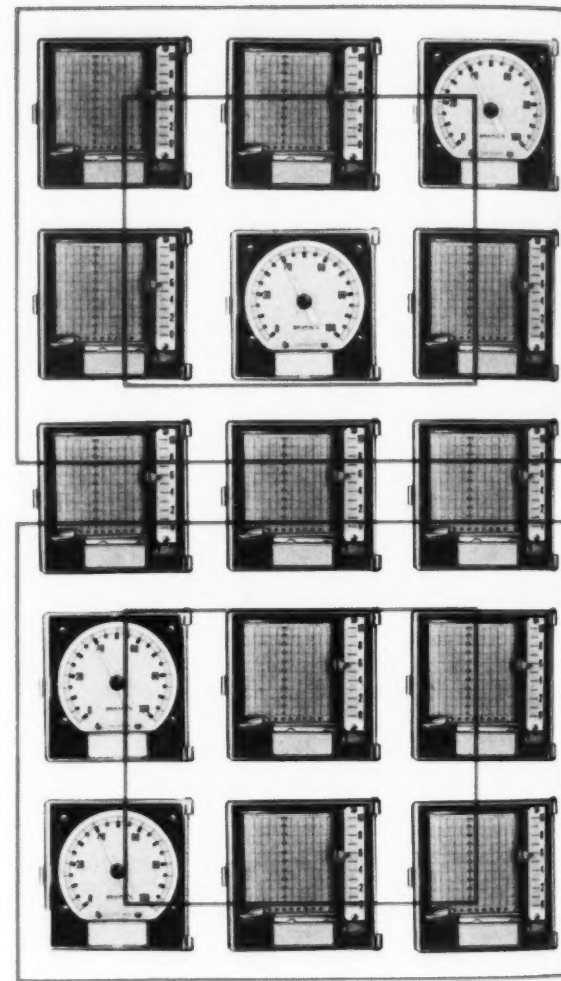
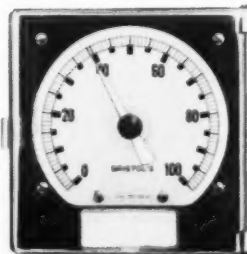
4. **High-torque gradient and low dead band (0.15%).** Plenty of torque for operating alarm contacts, re-transmitting slidewires, and electric control contacts.

5. **Field-interchangeable range cards,** easily accessible without special tools or skill, make instrument versatile in application.

And last but not least, the new Series 663 Dynamaster instruments give you all the features that have made Bristol a by-word among instrument men. For example; building block construction and completely interchangeable parts speed servicing. Human engineered dials and charts make reading easy, accurate.

Write for the complete story on the miniature Bristol Series 663 Electronic Dynamaster instruments. And remember, for either electronic or pneumatic graphic-panel-type instruments, Bristol has the widest line on the market. The Bristol Company, Waterbury 20, Conn.

NEW INDICATING MODEL in the Series 663 is completely interchangeable with recorder of similar characteristics. Takes just 10 seconds to remove recorder and plug-in indicator, or vice versa.



Now you can mount 15 miniature electronic instruments in space taken by 2 conventional electronic instruments (shown by red outline). Both give equal performance. New Bristol Series 663 recorders and indicators are full-size electronic instruments in everything except actual physical dimensions; are the only 3-inch chart electronic instruments using true motor-driven self-balancing mechanism.

BRISTOL TRAIL-BLAZERS IN
PROCESS AUTOMATION
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

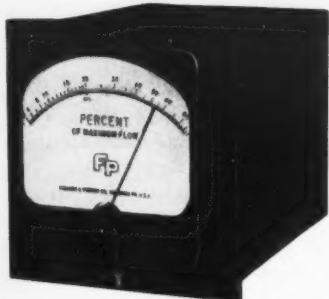
INSTRUMENTATION

Indicates flow rate as percentage

Uses: As inexpensive flow rate indicator for use with company's turbine-model primary metering elements.

Features: Flow rate indicator shows flow rate as percent of maximum flow.

Description: Flow rate indicator converts output signal of



Integrates flow meter output and indicates flow as percent of maximum flow

turbine meter into series of pulses of constant amplitude. Pulse frequency is equal to that of turbine meter output, and proportional to volumetric flow rate.

A DC milliammeter integrates the pulses and provides an indication proportional in frequency and to flow rate. External terminals are provided for pulse and DC millivolt signals. Shaded pole panel meter with a logarithmic characteristic provides uniform rate accuracy of 2% at a short term repeatability of 0.5% of rate.

(Flow rate indicator is product of Fischer & Porter Co., Dept. CP, 808 Jacksonville Rd., Hatboro, Pa. . . . or for more information check 3341 opp. last page.)

For more information on product at left, specify 3342 . . . see information request blank opposite last page.

For more information on product at right, specify 3343 . . . see information request blank opposite last page.



SR-4® LOAD CELLS OFFER YOU NEW ACCURACY—EASE—ECONOMY IN ALL INDUSTRIAL WEIGHING AND PROCESSING

Baldwin SR-4 Load Cells end the costly task of moving loads to and from a weighing unit. Now weigh right in process! Compact Baldwin transducers will measure any tension or compression force—shaft or jet engine thrust—cable tension; determine center of gravity, weight and balance. The applications are virtually unlimited. Weigh loads at rest or in motion. Measurements are accurate to better than $\pm 1/4\%$; repeatability is better than $\pm 1/10\%$.

Standard Baldwin SR-4 Load Cells range in capacity from 50 to 200,000 lb. The varying electrical signal from the SR-4 Bonded Wire Strain Gage, basic component of the load cell, can be fed to a wide variety of Baldwin recording or computing equipment.

Whatever your weighing problem, a B-L-H representative can help you. For more information, write today for your free copy of Bulletin 4301 on SR-4 Load Cells.

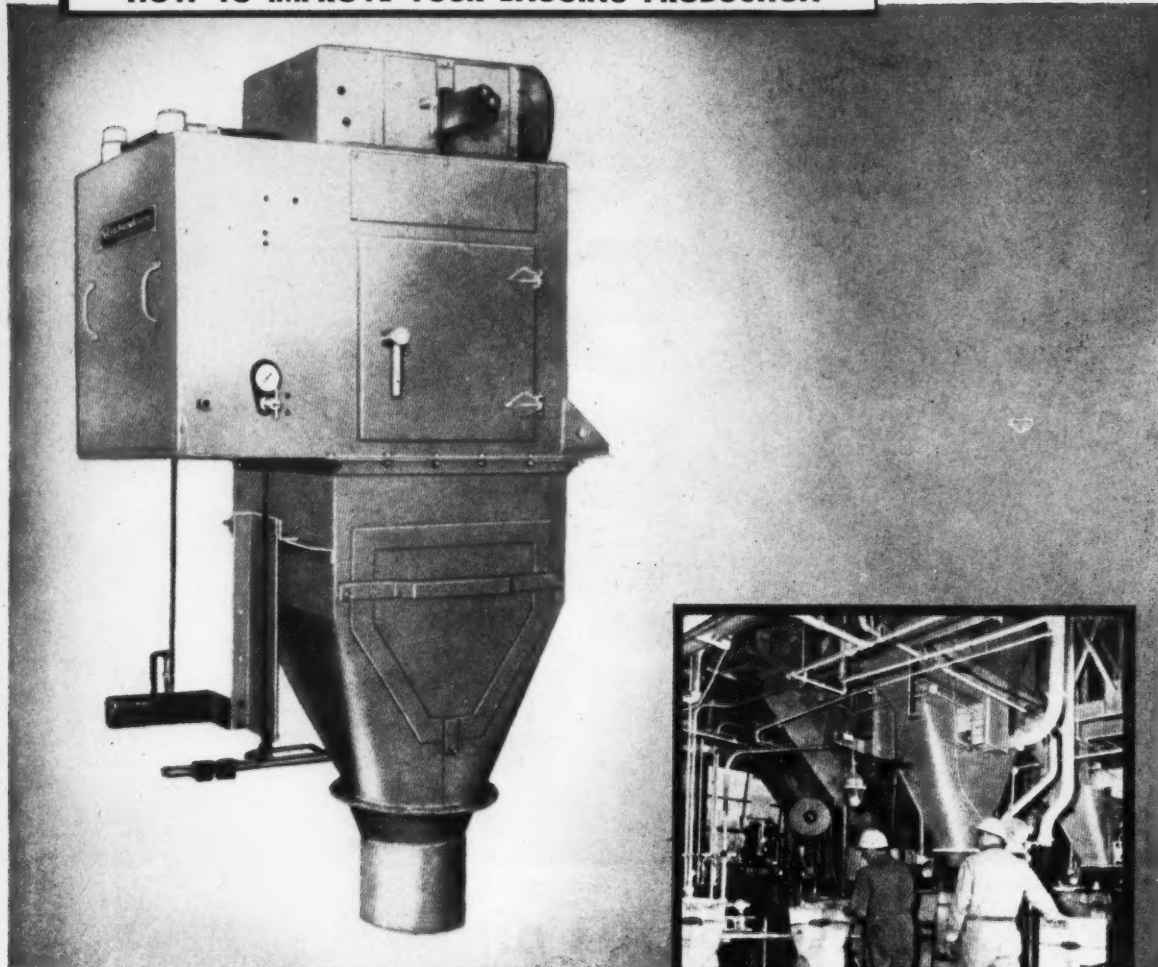
BALDWIN · LIMA · HAMILTON
Electronics & Instrumentation Division

Waltham, Mass.

SR-4® strain gages • Transducers • Testing machines



HOW TO IMPROVE YOUR BAGGING PRODUCTION



Richardson Bagging Scales

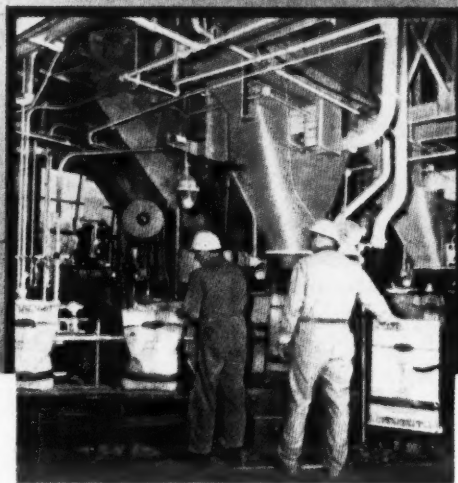
give faster speeds with closer accuracies

Efficient and reliable bagging scales are the answer to today's need for faster production and lower per unit cost. Richardson Scales meet these requirements. And you avoid inaccuracies of underweights and overweights even at high bagging speeds. With over 55 years of experience in materials handling by weight, Richardson produces the highest quality bagging scales

to provide stepped-up operations at lowest over-all cost. Simplicity of design and sturdiness of construction assure long life and dependability.

Richardson Bagging Scales are available in many models for many types of materials handling in bagging ranges of 25-250 lbs. The E-50 illustrated is extremely versatile in bagging most types of materials at speeds up to

twelve 100-lb. bags per minute and within an average accuracy of ± 1 to 2 oz. or better. Special scales for flour, sugar, rice, feed and chemicals are available. Low cost automatic proportioning systems and engineering service are Richardson specialties. Write today for details on Richardson Bagging Scales for the Food and Chemical Industries.



Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1912

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY
Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit • Houston • Memphis • Minneapolis
New York • Omaha • Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal
Toronto • Havana • Mexico City • San Juan • Geneva, Switzerland • Nottingham, England

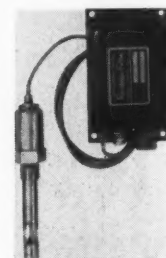
When inquiring check 3344 opposite last page

INSTRUMENTATION & CONTROL

Senses and controls liquid levels with critical accuracy

Liquid level switch uses radioactive material in pencil-size sending element

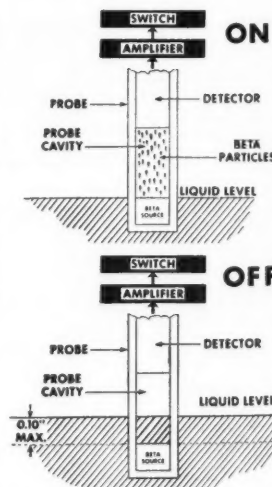
Uses: As liquid level sensing instrument and switch for control of critically-important fluid levels in tanks or other containers. Instrument is designed to operate reliably and accurately under extremes of vibration and shock without loss of sensitivity.



Liquid level switch employs radioactive material and sending element

Features: Radioactive material furnishes beta particles for measuring liquid level. Accuracy is to plus or minus 1/10 inch — whether liquid is rising or falling.

Description: Originally designed for fuel level determination in supersonic air craft and missiles, liquid level switch is available for industrial use. Instrument consists of a pencil-size sending probe containing a hermetically-sealed beta source. Beta detector, a geiger mueller tube, is mounted inside liquid container. Beta source and detector are separated by small cavity into which liquid may flow.



Beta source and beta detector are two elements of highly accurate liquid level switch

When no liquid is present, radioactive particles pass from beta source to detector tube. However, when liquid enters cavity, it absorbs the radioactive particles, reducing radiation level at detector. Change in radiation is converted to electrical signal. After amplification by a transistorized unit, signal actuates a relay. Signal response time is approximately 1/20 second.

Sensing probe is $\frac{1}{2} \times \frac{4}{4}$ inches, weighs two ounces. Transistorized amplifier is $3\frac{3}{4} \times 2\frac{5}{16} \times 1\frac{1}{4}$ inches and weighs seven ounces. Switch is available in such materials as stainless steel for corrosive conditions. Operation is on a 28 volts

INSTRUMENTATION & CONTROL

DC at 0.05 amps. DPDT relay will switch a 2 amp load.

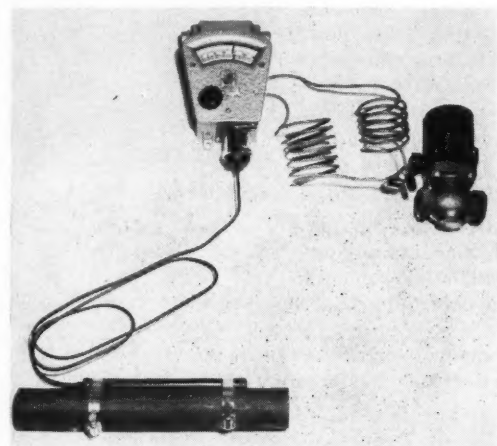
(Liquid level switch is product of Aeronautical Division, Robertshaw-Fulton Controls Company, Dept. CP, Santa Ana Freeway at Euclid Avenue, Anaheim, Calif. Check 3345 opposite last page.)

Permits use of Impervious carbon in measuring and controlling temperatures . . .

thermal bulb is strapped onto impervious graphite pipe and covered with insulation

Uses: Measuring and controlling temperatures of highly-corrosive liquids.

Features: Thermal bulb is strapped onto impervious carbon (or other material suitable to liquid being handled) and covered with insulation. Bulb does not impede flow nor come in contact with the corrosive liquid.

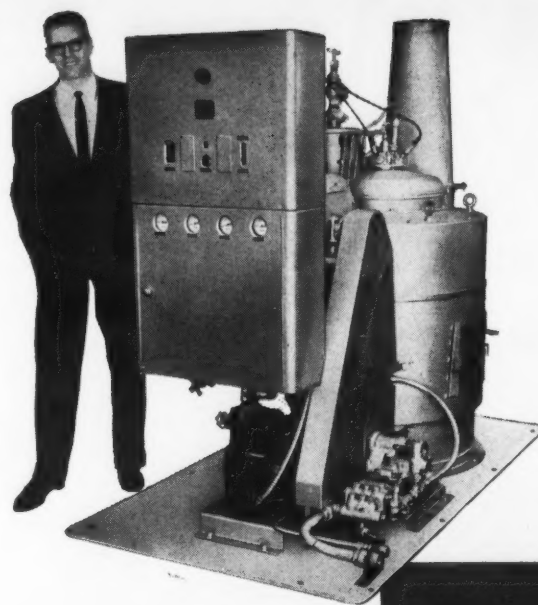


Thermal bulb measures temperature through section of impervious carbon pipe

Description: Temperature control unit can be installed on any of manufacturer's Camac heat exchangers. Short section of impervious graphite carbon or graphite pipe is inserted into suction line between tank and exchanger. Control can be located at any convenient location at safe distance from corrosive-solution tank. Solenoid valve is installed in steam or coolant line. Both heating and cooling functions can be controlled with same control unit.

Two models are available. One model includes an indicating dial showing tank temperature. Second model does not indicate.

(Series P and R temperature control units are product of Carl Buck & Associates, Dept. CP, Essex Fells, N. J. Check 3346 opposite last page.)



**don't use floor space
for your boiler room**

VAPOR MODULATIC

WATER TUBE BOILER

*you can put it on the roof—
on a balcony—or hang it
from the ceiling*

produces up to 4 h.p. per sq. ft. of area

- Develops up to 27 H.P. per 1000# of weight.
- Produces up to .6 H.P. per cubic ft. of space used.
- Needs only 15" above top of boiler for maintenance. No additional floor space needed.
- Can produce 10% or more above ratings, continuously.
- Full ASME approved.
- It is a complete package unit.
- Proved by 25 years in America's toughest boiler rooms.

**8 sizes: 10 to 160 H.P.
Pressures: 5 to 900 psig**

**Write for complete specifications on the boiler
that requires less space and permits lighter floor
structure—The Vapor Modulatic.**

**PAY FOR YOUR STEAM
THRU FLOOR SPACE SAVED**

**OVER 13,000
SATISFIED USERS**

VAPOR HEATING CORPORATION, 80 E. Jackson Blvd., Chicago 4

Dept. 3-E

Send me Modulatic Bulletin No. 586.

Name _____ Title _____

Company _____

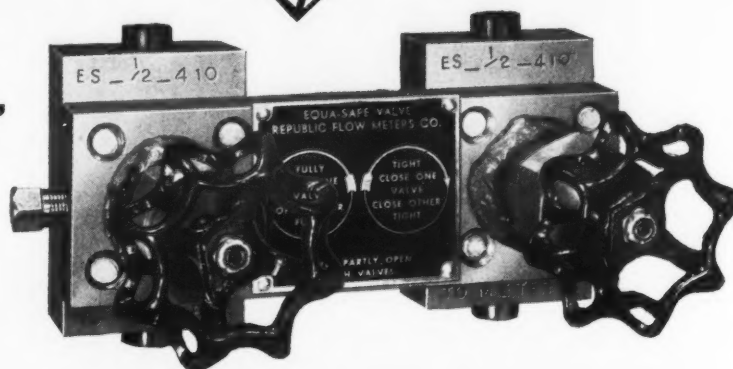
Address _____

City _____ Zone _____ State _____

When inquiring check 3347 opposite last page

NOW AVAILABLE

**Valve Manifolds
that STOP
Mercury Blowing,
Damage to
Differential
Bellows
and Diaphragms**



- CANNOT throw full line pressure across bellows, mercury or diaphragms of ΔP instruments.
- Replaces 3 or 4 conventional shut-off valves, fittings, etc.
- Rated to 4000 psi (cold)
- Available with angle, 3-way or through-type bodies ... threaded or socket-welded connections.

No conventional built-up valve manifold affords the protection EQUA-SAFE automatically gives to differential pressure type instruments. And no built-up valve manifold can beat the low installation time or low maintenance required by EQUA-SAFE valves.

The "secret" of EQUA-SAFE's protection is in the common bridge-type bonnet and the two double-seating valves it connects. When either valve is operated (and sequence does not matter) pressures in the two chambers of the differential instrument are automatically equalized through the bonnet. As soon as both valves are fully "opened" (stem out) the instrument is on the line, with no leakage between sides. When both stems are in, the instrument chambers are interconnected and completely sealed off from primary connection pressures. Teflon packings are under pressure only while the stems are traveling from "seat" to "backseat", or vice versa!

Standard EQUA-SAFE valve manifolds are made of carbon and/or stainless steel, depending on your requirements. If your requirements are unusually severe, remember that EQUA-SAFE valves can be made of any bar stock material that can be machined and welded! When inspection or maintenance are needed, this bolted-block construction pays off again. EQUA-SAFE valves can be completely dismantled without breaking any pipe connections, and the inlet seat can be dressed up in place. A reversible backseat ring gives double wear, and is merely turned upside down to present a brand new seat.

Get the entire story on what EQUA-SAFE valves can do for your differential instrument installations. Write for Republic Bulletin No. 56-1, or ask your Republic engineer. Now that there is a top-quality instrument valve manifold for ΔP instruments, you should definitely investigate its applications in your plant.

REPUBLIC FLOW METERS CO.

2240 Diversey Parkway, Chicago 47, Illinois

When inquiring check 3348 opposite last page

INSTRUMENTATION & CONTROL

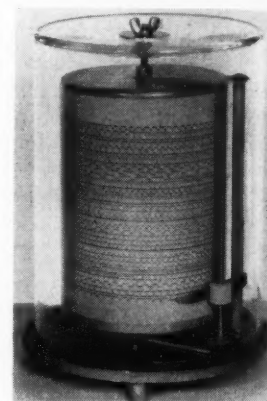
Graphically proves operation and time of use . . .

operations recorder uses wax-coated, water-proof paper; stylus cuts red line

Uses: As graphic recorder on individual machines or process units to record length and time of operation.

Features: Operations recorder uses wax-coated water-proof paper to record data. Stylus cuts sharply-contrasting red line without blurring or smudging.

Description: Drum of operations recorder rotates at specified speed. Stylus moves with drum rotation, cutting record on chart paper according to input signal. Use of 24-hour rotation chart allows exact comparison of corresponding days, as all are lined up vertically. Housing of unit can be glass, plastic, or metal. Transparent housing permits continuous tamper-proof observation of tracing.



Transparent cover of operations recorder allows constant observation of recorded data

Recorder can be mounted in any position. Various combinations of drum speeds are available. Unit is 6 x 8 inches. Weight is approximately eight pounds. Operations can be on 115v AC 60 cycle, or other voltages and frequencies as required.

(MD-Jr fact recorder is product of Gorrell & Gorrell, Dept. CP, Haworth, New Jersey . . . or for more information check 3349 on form opposite last page.)

Instrument cases of glass fiber withstand corrosive conditions or outdoor use . . .

complete line of controllers and indicators will be housed in plastic-fiber case

Uses: Glass fiber instrument case allows placement of pressure and temperature instruments in corrosive atmospheres or outdoors.

Features: Complete line of low-cost, small-size instruments for indicating, transmitting, and controlling pressure and temperature will be housed in plastic-impregnated glass fiber cases.

Description: All exposed parts of instrument case are either glass fiber or 316 stainless steel. Polyvinyl chloride gaskets around door and input

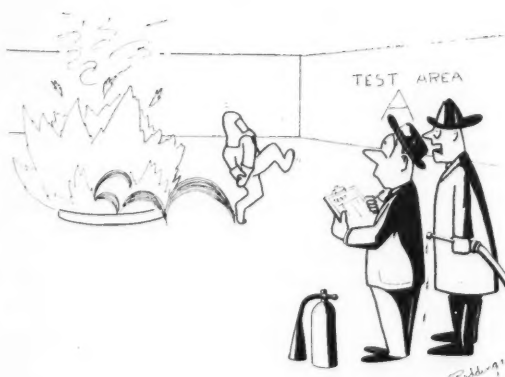


Glass fiber instrument case withstands corrosive atmospheres, outdoor use

lines seal out moisture and dust. Instrument case is suitable for surface, panel, or pipe mounting. Completely removable door is held in place by two stainless steel, 1/4-turn, cam-actuated knobs. Keeper is provided between door and case to prevent possible dropping of door.

Instrument case is designed to allow indicating, transmitting, or controlling equipment to be completely removed for servicing. Temperature range of instruments is from -400°F to +1000°F. Pressure range is from 30 inches Hg vacuum to 5000 psi. As pneumatic receivers, instruments accommodate 3 to 15, 3 to 18, or 3 to 27 psi signals. Instrument options include single or dual indicators, single indicator with dual alarms, indicating controller with any mode of control, and indicating transmitter. Four controller options are available.

(Series 1450 instruments are product of Fischer & Porter Company, Dept. CP, 951 Jacksonville Road, Hatboro, Penna. Check 3350 opposite last page.)



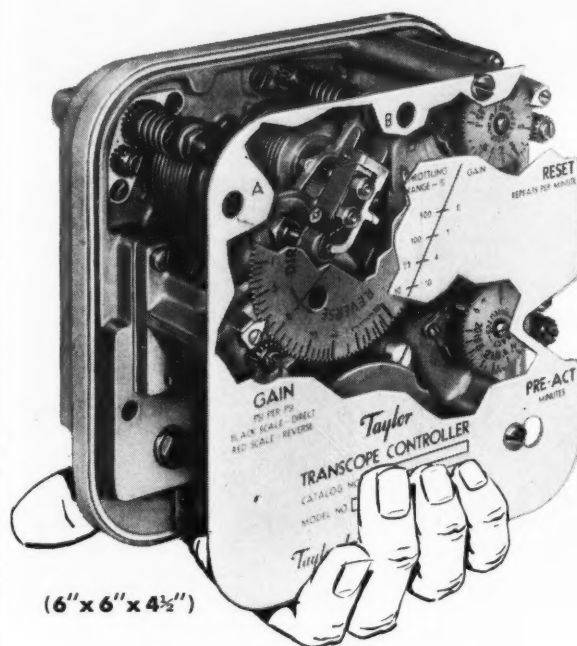
"I knew those metal fasteners were a mistake!"

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Indiana

NEW IN PRINCIPLE... NEW IN DESIGN... NO EQUAL IN PERFORMANCE!

New Taylor TRANSPSCOPE* Controller

The last word in Pneumatic Process Control



SUPERIOR PERFORMANCE

1. Especially suited for short spans of measurement... ideal for time constants of modern processing... outstanding in insensitivity to ambient temperatures.
2. Exceptionally fast and responsive to adjustments—vital on start-ups.
3. Accurate pre-determined mathematical settings made possible by precision manufacture of gain, reset and PRE-ACT* units. Adjustments stay put.

EXCEPTIONAL ADAPTABILITY

1. Adaptable to changes in process requirements... complete interchangeability of components so you can convert from simplest to most complex forms of control in the field... in minutes.
2. Instrument action reversed by merely rotating a dial. Plugs into TRANSET* Indicators and Recorders or locally mounted manifolds.
3. Designed to meet the demand for more compact instruments, it is ideally suited for use in graphic panels and scanning and logging systems.

SIMPLE MAINTENANCE

1. Rugged bellows assembly, keyed in place, moves the dynamically balanced force plate... friction-free bending member never needs maintenance.
2. Husky die-cast aluminum assemblies, accessible stainless steel nozzle and baffle, hardened stainless
3. Integral cut-off relay is a built-in feature.

4. Easy to understand... easy to get at... simplifies maintenance training.

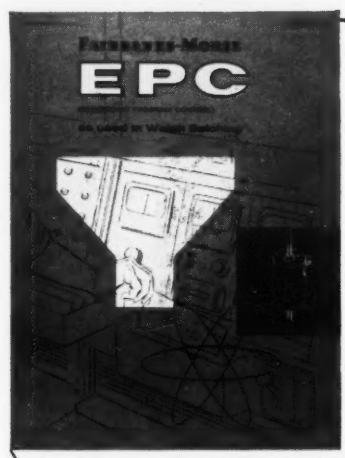
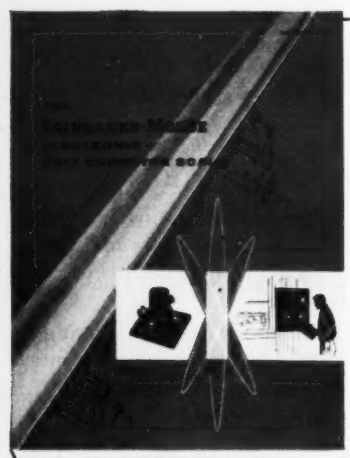
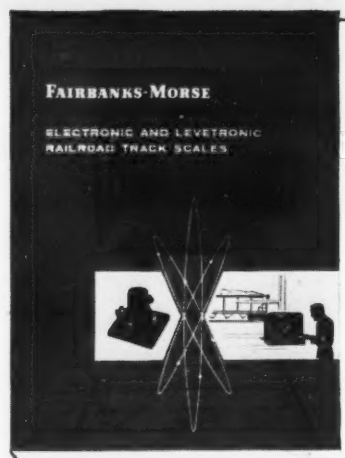
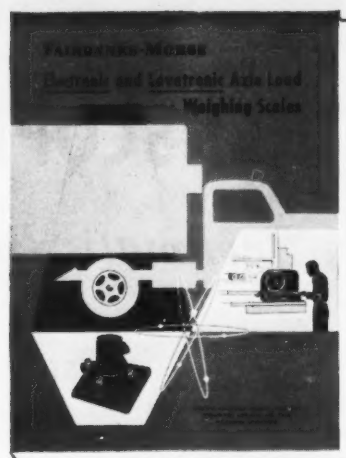
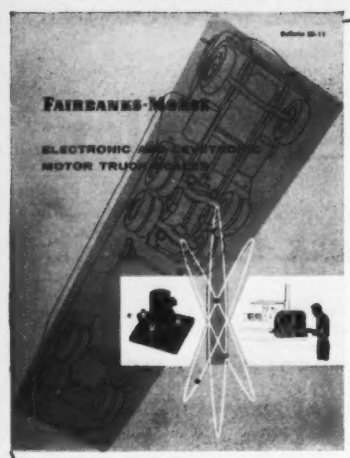
The **Transscope Controller** is so compact, so simple, so smooth and responsive to adjustments yet so accessible for every purpose that it really "gets" you. But the "pay-off" doesn't come until you put it on your toughest job. Only then can you realize how contagious enthusiasm can become.

Write for **Bulletin 98278**. Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

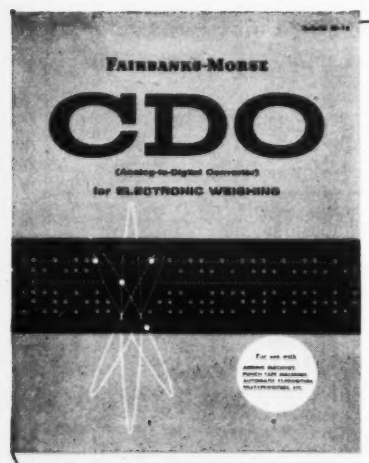
Taylor Instruments
— MEAN —
ACCURACY FIRST

VISION • INGENUITY • DEPENDABILITY

When inquiring check 3351 opposite last page



The story of Fairbanks-Morse Electronic Scales in seven volumes



Just off the press—seven new bulletins about Fairbanks-Morse electronic weighing and batching machinery. The covers pretty well identify themselves as illustrated above, except that you might not know that EPC is a completely automatic batching system that operates from punch cards . . . or that Batchetron is a slightly less automatic batcher with quick provision for manual preset of the cycle . . . or that CDO is a "read-out" instrument that will translate the weight message of any of the other six into the language "spoken" by automatic typewriters and automatic adding machines and automatic tape punches.

Write today for one or more of the new bulletins on Fairbanks-Morse electronic weighing and batching. Fairbanks, Morse & Co., Scale Division, Dept. CP-5, 600 South Michigan Avenue, Chicago 5, Illinois.



FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

When inquiring check 3352 opposite last page

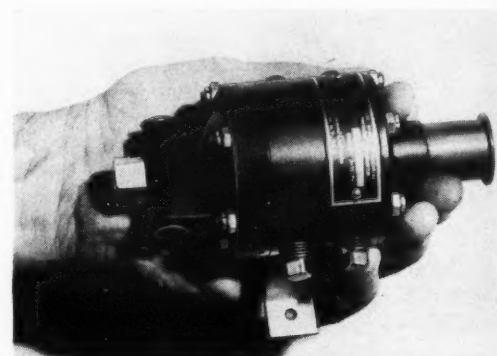
INSTRUMENTATION & CONTROL

**Cuts costs of instrumentation
to check departmental use
of steam, water, air . . .**

can be practical cost accounting aid for applications previously thought marginal

Uses: As fixed range differential transmitter for measurement and control of utility flows such as steam, water, and air. With seals or purges, unit can be adapted to measure other fluids.

Features: Transmitter has been designed as low-cost unit with minimum of installation cost. Brass and aluminum are used extensively in construction. All aluminum parts are coated for protection against galvanic corrosion.



Flow transmitter is small-sized and light in weight

Description: Transmitter uses force balance based on pressure exerted on diaphragm areas. Differential pressure developed across sensing diaphragm is balanced by a 3-15 psi output pressure which builds up in air supply chamber. Force is thus created on feed-back diaphragm equal to force on sensing diaphragm. Calibrated accuracy is 1%. Although primarily designed for flow measurement, instrument can be readily adapted to measure liquid level, pressure, and specific gravity.

Complete processes can be control-engineered to furnish practical cost accounting aid in installations previously considered marginal.

Transmitter can be pipe-mounted. All connections are 1/4" internal NPT. Body material is brass. Diaphragm is neoprene-coated nylon. Maximum working pressure is 150 psi; temperature is 150° F. Air supply pressure is 20 psi. Air consumption is 0.10 standard cu ft/min. Weight is 4 1/2 lb. Unit measures 6 1/2 x 3". Ranges are: 0 to 50, 100, 200, and 300 inches water.

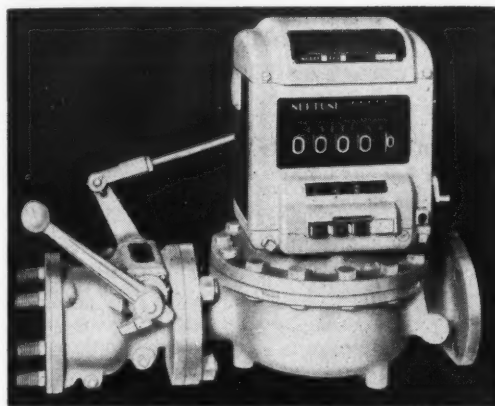
(Model 200TD differential transmitter is product of Taylor Instrument Companies, Dept. CP, 95 Ames Street, Rochester 1, New York. . . . or for more information reader may simply check 3353 on the convenient Reader Service slip which is located opposite last page.)

**'Remembers' liquid batch size
and delivers same quantity
every time . . .**

repeating liquid batching meter shuts off
when preset quantity is reached

Uses: As liquid batching meter for production
blending operations where same formula is repeated.

Features: Quantity setting of batching meter
can be changed by simply pressing control buttons
after turning re-cycling knob.



Control register mounts on existing meters

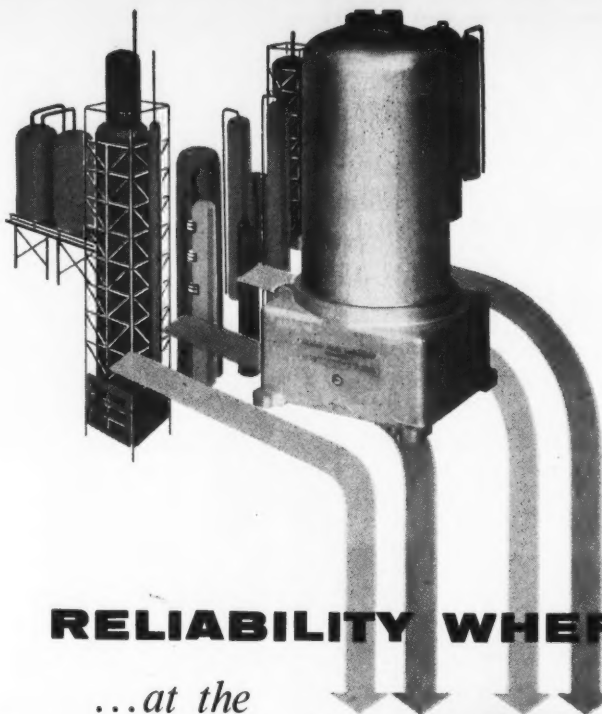
Description: Repeating liquid batching instrument consists of repeating register with control mechanism, mounted on manufacturer's present liquid meters. Register can be purchased separately for conversion of existing meters. Complete batching units are available in sizes of 1, 1½, 2, and 3".

(Repeating Auto-Stop batching meter is product of Neptune Company, Dept. CP, 19 West 50th St., New York 20, N.Y. . . . or for more information check 3354 on form opposite last page.)

**Describes computing device
for pneumatic circuits**

Computing device which can be used in pneumatic measurement or control circuits is described in 8-page catalog. Square root extraction, ratio setting, division, multiplication, squaring, pressure or temperature compensation on transmitted flow signals are possible with device. Operations and specifications are listed, and applications shown.

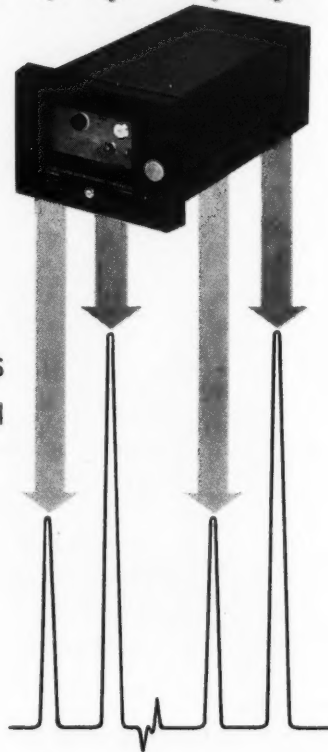
Cat C80-1 is issued by Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3355 on form which is located opposite last page.



RELIABILITY WHERE IT COUNTS

*...at the
process stream*

**CEC's PROCESS
CHROMATOGRAPH**



REMOTE OPERATION

Mounted at the sample point—operated from the control house—CEC's Type 26-202 Process Chromatograph gives you a simple, trouble-free system in two units. The Analyzer unit meets specifications for installation in Class I, Group D, Division 1 hazardous locations. From its remote location, the Control unit provides timing and control for all programming requirements.

OUTSTANDING RELIABILITY

There are no vacuum tubes in the CEC Process Chromatograph. Its one power supply is completely transistorized. Accuracy of detector elements and calibrations can be checked at the Control unit.

SUPERIOR REPRODUCIBILITY

Precise regulation gives you these specific advantages: Sample volumes are reproducible to better than $\pm 1/2\%$. Sample and column temperatures are held within $\pm 1^\circ\text{F}$. Variations in the carrier gas flow-rate cannot exceed $\pm 0.1\%$, and voltage regulation for the thermal conductivity cell is better than 0.05%.

BEFORE YOU BUY any gas chromatograph, get acquainted with CEC's Process Chromatograph. For complete data and cost of this fast, inexpensive analyzer, contact your nearby CEC field office, or write for Bulletin CEC 1836-X8.

Consolidated Electrodynamics



300 North Sierra Madre Villa, Pasadena, California

NATIONWIDE COMPANY-OWNED SALES & SERVICE OFFICES

When inquiring check 3356 opposite last page

CONOFLOW...

THE FIRST NAME IN AIR OPERATED SAUNDERS VALVES

THOUSANDS IN
USE
IN LEADING
COMPANIES

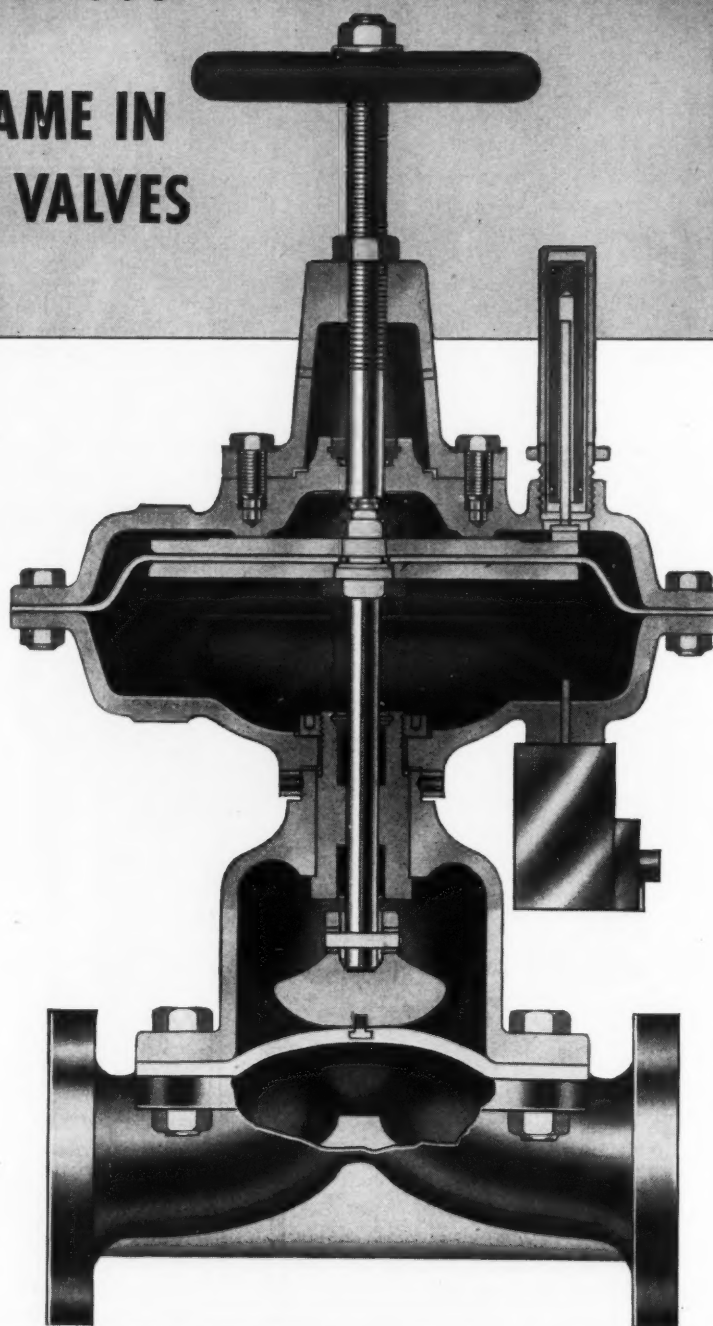
When you specify Conoflow Air Operated Saunders Valves your confidence is affirmed by thousands of successful installations. Many Conoflow Saunders Valves have been in constant, 24-hour-a-day service, year in, year out, requiring little or no maintenance.

When you specify Conoflow Close-Coupled Saunders Valves you know that you are getting the benefit of more years of experience in this line than any other valve manufacturer can offer. This extra engineering "know-how" enables Conoflow to provide:

- Valves in all sizes for both on-off and throttling control—with many original and time-proved optional features.
- Wholly integrated design—complete valve assembly made at the Conoflow factory by experienced men.
- Highest quality construction materials—the right material for the right job.
- Positive performance—every unit completely tested for dripless shut-off and peak operating efficiency before shipment.

When you specify Conoflow Saunders Valves you are certain that you are getting the best Saunders valve available . . . and at a competitive price.

WRITE FOR NEW BULLETIN HB-6 DESCRIBING THE COMPLETE LINE OF CONOFLOW SAUNDERS VALVES. IT WILL BE MAILED PROMPTLY.



CONOFLOW CORPORATION
2100 ARCH STREET, PHILADELPHIA 3, PA.

FOREMOST IN FINAL CONTROL ELEMENTS



CC 706

When inquiring check 3357 opposite last page

INSTRUMENTATION & CONTROL

Details information on selection of annunciator

In addition to listing manufacturer's line of alarm systems, 20-page catalog presents detailed information on what to consider when selecting an annunciator. Wiring diagrams for alarm units and sample alarm sequences common to many plants, along with other engineering and installation data, are included.

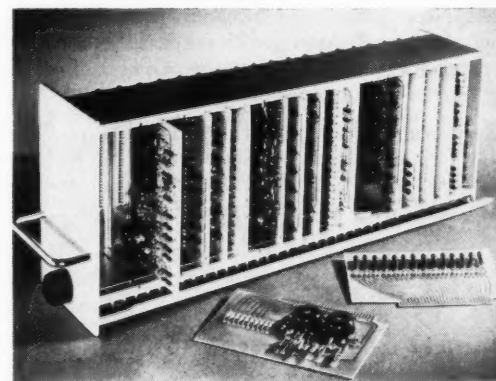
"Scam Self-policing Annunciator Systems for Industry" is issued by Scam Instrument Corp., Dept. CP, 1811 W. Irving Park Rd., Chicago 13, Ill. When inquiring specify 3358 on form opposite last page.

Data processing system gives all the figures when you want them . . .

system receives data from various process points and makes necessary process calculations

Uses: Computing and logging secondary guides for industrial processes and productive control.

Features: By continuously and automatically computing data from various control points, calculations by operating personnel are eliminated. Output is in form of simple numbers, accurate to three figures.



Modular design of computing converter is based on transistorized logic circuits

Description: Heart of system is manufacturer's CADC (Computing Analog-to-Digital Converter) which handles channels of incoming information from thermocouples, pressure gauges, stream-analysis instruments, flow measurement instruments, etc. These data, in form of electrical signals, are automatically sorted, stored, converted to digital numbers, or combined in complex mathematical formulas.

An example of system's operation is the case of "carbon-burning rate" in catalytic cracking of

CHEMICAL PROCESSING

petroleum. This information can be had almost immediately by automatically and continuously feeding in measurements of air volumes and compositions of flue gases to give calculations of the formula previously being placed in system.

("112" data processing system is manufactured by Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Rd., Fullerton, Calif. . . . or for more information check 3359 opposite last page.)

Dual-range thermistor controllers can be used in applications requiring sub-zero range . . .

selector switch allows instant change without need for recalibration

Uses: As temperature controllers for either one of two control modes: on-off (two position) control; and time-modulated proportioning. Can be used in applications requiring sub-zero range.

Features: Two models of dual-range temperature controllers are thermistor-actuated. Ranges can be switched instantly without recalibration by positioning a selector switch on front panel.

Description: Operating range of one model is 200 to 600°F and 100 to 300°F, providing a total coverage of 100 to 600°F. Second model covers from -100 to +50°F and 0 to 150°F, for a total spread of -100 to +150°F. Being thermistor-actuated temperature controllers, instruments allow exceptionally accurate control (0.25% over their entire control range). Connecting leads can be up to 200 feet long, using ordinary electrical wiring without diminishing

sensitivity and control accuracy. Instrument is not position-sensitive, can be moved from one location to another without affecting accuracy or calibration.

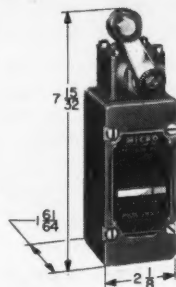
Instruments have separate circuits for indication and control. Integral SPDT power relay is rated at 10 amps, 115v AC. Thermistors sensing element can be supplied encased in a stainless steel probe 3/16 or 1/8" in diameter and 2 to 5" long. Choice of three types of mounting heads is possible.

(Series 56006 and 56007 temperature controllers are product of Fenwal, Inc., Dept. CP, Ashland, Mass. Check 3360 opposite last page.)



Temperature controllers have dual ranges for flexible application

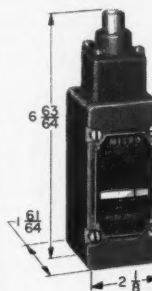
MICRO SWITCH . . . FIRST IN PRECISION SWITCHING



Series ML-E1—Roller Arm Actuator

For operation by cams or slides. Actuation may be clockwise, counterclockwise or in both directions. Roller is of a non-sparking, wear-resistant material.

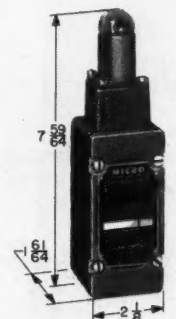
Characteristics: Operating force 2 lbs. max.; Release force 1/4 lb. min.; Pretravel 12° max.; Overtravel 60° min.; Differential travel 4° max. Also available with operating force of 3 lbs. max.



Series ML-E1—Plunger Actuator

Has a non-sparking plunger actuator for severe limit-of-motion service. Direction of actuation must be in line with the motion of the plunger.

Characteristics: Operating force 6 lbs. approx.; Release force 4 lbs. approx.; Pretravel .025 in. max.; Overtravel .500 in. min.; Differential travel .005 in. max.



Series ML-E1—Roller-Plunger Actuator

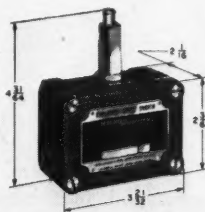
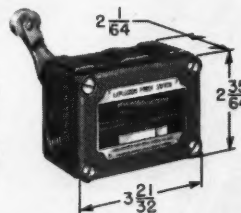
For cam or slide operation. Entire head assembly can be rotated 90° in order to accept a means of actuation whose approach is from an angle perpendicular to the mounting surface.

Characteristics: Operating force 6 lbs. approx.; Release force 4 lbs. approx.; Pretravel .025 in. max.; Overtravel .500 in. min.; Differential travel .005 in. max.

Series EX—Roller Arm Actuator

Designed for cam or slide operation. Actuator arm is operated by clockwise rotation—is thoroughly adjustable through 360°.

Characteristics: Operating force 1/2 to 1 1/4 lbs.; Release force 1/4 lb. min.; Pretravel .219 in. max. (8°); Overtravel 90° max.; Differential travel .007 in. max. (1/4°).



Series EX—Plunger Actuator

For use as a limit switch on in-line motion applications.

Characteristics: Operating force 3 lbs. max.; Release force 1/4 lb. min.; Pretravel 5/64 in. max.; Overtravel 3/16 in. min.; Differential travel .004 in. max.



Write for Catalog 83 for information on these and other enclosed switches

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS



These
**RELIABLE
SWITCHES**
will protect
your operations
against
many types
of plant fires
and explosions

They combine precise operation, accurate repeatability, small size, easy adjustment and durable construction with ability to operate safely in explosive gas or vapor-air atmospheres.

Underwriters Listed for these locations

Hazardous locations Class I, Group C (atmospheres containing ethyl-ether vapor) and D (atmospheres containing gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas); Class II, Group E (metal dust) Group F (carbon black, coal or coke dust) Group G (grain dust).

Electrical Ratings of Explosion-proof Switches

ML-E1 Series—20 amperes 120, 240 or 480 v ac; 1/2 ampere 115 v dc; 1/4 ampere 230 v dc; 1/4 H.P. 120 v ac; 1 1/2 H.P. 240 v ac.

EX Series—15 amperes 125, 250 or 460 v ac; 1/2 ampere 125 v dc; 1/4 ampere 250 v dc. Also available in 20 ampere ratings.

When inquiring check 3361 opposite last page

PRINCO DIAL THERMOMETERS

**HAVE FULLY ADJUSTABLE
DIAL AND POINTER**
for easy reading in any location

Sturdy, sensitive, accurate PRINCO 4" Dial Thermometers are made so that pointer and scale can be set to any desired position. This permits the reading axis of the thermometer to be vertical regardless of the position of the instrument. In addition, these smooth operating, precise thermometers are:

- accurate to 1% of range
- moisture and fume proof
- made in bottom connected and back connected styles with stainless steel stems and connector nuts

PRINCO Dial Thermometers are also available in 2" and 3" diameter, fume and moisture proof case of all stainless construction and adjustable dial only.

Write, wire or call for information and catalog.

PRECISION THERMOMETER & INSTRUMENT CO.

1434 Brandywine Street • Philadelphia 30, Pennsylvania
RI 6-6671



Complete adjustment of pointer and scale means reading axis is always adjustable to 12 o'clock regardless of stem angle.

When inquiring check 3362 opposite last page



ACCURATE EASY READING MANOMETERS

For precise reading as well as for accurate measurements choose Trimount Manometers.

Sturdy construction—long lasting—used for many purposes—Multiple Tube, Well Type, U Tube, etc. Also custom made to your specifications.

Write for
Illustrated Bulletin C

Trimount
INSTRUMENT CO.
3119 WEST LAKE STREET • CHICAGO 12, ILLINOIS

When inquiring check 3363 opposite last page

INSTRUMENTATION & CONTROL

**Substitute flow transmitters,
electric or pneumatic,
as required . . .**

twin transmitters allow standardization
on floats and float extensions

Uses: As interchangeable electric and pneumatic flow transmitters to be used with manufacturer's rotameters.

Features: Transmitters are completely interchangeable. User need stock only one float and one float extension for direct flow indication. Extensions can



Twin flow transmitters are interchangeable. Units allow either pneumatic or electric remote flow transmission

be interchanged without even removing rotameter from line.

Description: Twin transmitters consist of essentially three units, two of which are common to both pneumatic and electrical transmitter. Both transmitters have same rotameter extension unit and same interchangeable armature unit. Pneumatic and electrical transmitter units are different from each other, but can be readily interchanged, by means of three screws. Less than five minutes is required to make the switch.

Each assembly unit is self-aligning. Each transmitter is protected by chemical-resistant and weather-tight glass fiber case.

Transmitters are designed for use with either direct-indicating rotameters or for high-pressure, high temperature, hard-to-handle fluids requiring heavy duty construction. Several model sizes of

Lumenite

AUTOMATIC CONTROLS

ELECTRONIC LIQUID LEVEL
INDUSTRIAL TIMERS
TIME SWITCHES
MAGNETIC SWITCHES

Ask for
Bulletin

FL—Liquid Level
FM—Milk Level
FN—Nonconductive Liquid
ITC—Ice Thickness
BM—Boiler Level

Ask for
Bulletin

LT—Time Switches
PC—Program Clocks
CR—Cycle Repeaters
R—Time Delay Relay
RMC—Automatic Reset

Lumenite Electronic Company

407 S. Dearborn Street Chicago 5, Ill.

When inquiring check 3364 opposite last page

for GREATER SAFETY &
LONGER STARTER LIFE

THIS SQUARE D COMBINATION STARTER...

• You save time and money when you install one device instead of two. You save mounting space, too. And you have a neater, more compact installation.

Square D's Switch gives you no less than eight design features which provide plus performance and operator safety.

Square D's Starter design provides quicker, easier maintenance and exceptionally long life.

Write for Bulletin 8538. Address Square D Company,
4041 N. Richards Street, Milwaukee 12, Wisconsin

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE



SQUARE D COMPANY

When inquiring check 3365 opposite last page

CHEMICAL PROCESSING

transmitters cover flow ranges from 0.06 to 1500 gpm (water).

(Transi-Twins transmitters are product of Brooks Rotameter Company, Dept. CP, Lansdale, Pa. . . or for more information reader may simply check 3366 on the convenient Reader Service slip which is located opposite last page.)

Senses pressure variations in corrosive fluids . . .

differential-pressure pickup uses strain-gage element and single diaphragm

Uses: To measure or control differential pressure of corrosive or conductive fluids — over pressure differentials from $\pm 1/2$ psi to ± 1000 psi at line pressures to 2000 psi.

Features: Pickup element uses a strain-gage to sense pressure variations. Only Teflon and 18-18 stainless steel contact pressurized fluid.

Description: Pressure differences are transmitted from single diaphragm through mechanical linkage to strain-gage element. Isolation of strain-gage is accomplished by double chamber arrangement. Differential-pressure chamber contains single pressure-sensitive diaphragm and provides fluid inputs on either side of diaphragm. Deflections of diaphragm are transmitted by hinged linkage through force-transmitting seal into separate chamber containing strain-gage. Linkage-seal system has high natural frequency to utilize full sensitivity of unbonded strain-gage.

Only Teflon and stainless steel contact corrosive fluids in differential pressure pickup. Pencil shows size

Resolution is better than one part in 2500. Units can be installed with minimum system modifications. Pressure inputs are made through $1/8$ -inch pipe thread connections at either end of pickup case. Standard units operate with AC or DC excitation at 6, 12, or 15 volts with bridge resistances at 350, 600 or 800 ohms. Minimum full-scale outputs are 20, 40, or 50 millivolts. Measurements are accurate to 0.5 percent of full scale at 70°F. Temperature range is -65 degrees to +350 degrees F. Electrical connector is supplied.

(Differential pressure pickup is product of Dynamic Instrument Company, Inc., Dept. CP, Cambridge, Massachusetts. Check 3367 opposite last page.)

LINK-BELT P.I.V. means positive, infinitely variable speed control

Where modern production machines and operations demand extremely accurate transmission of power with variable speed control, no other variable speed drive can match the efficiency of the Link-Belt P.I.V. Here's how it works.

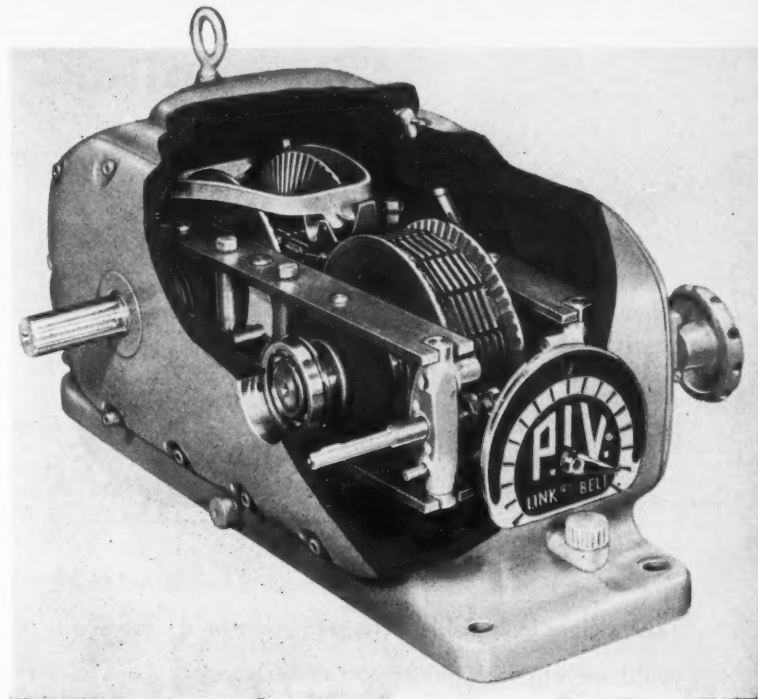
Because it employs an exclusive metal, self-tooth-forming chain, Link-Belt P.I.V. permits instant and accurate speed changing without perceptible loss of speed—regardless of load. And the variation can be accomplished without stopping the driven machine.

A mere turn of the control screw simultaneously varies effective diameters of conical wheels located on the input and output shafts. In turn, these radially grooved wheels mesh with the self-tooth-forming chain assuring positive selection of speed.

Call your nearby L-B office or authorized stock-carrying distributor for Book 2274.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

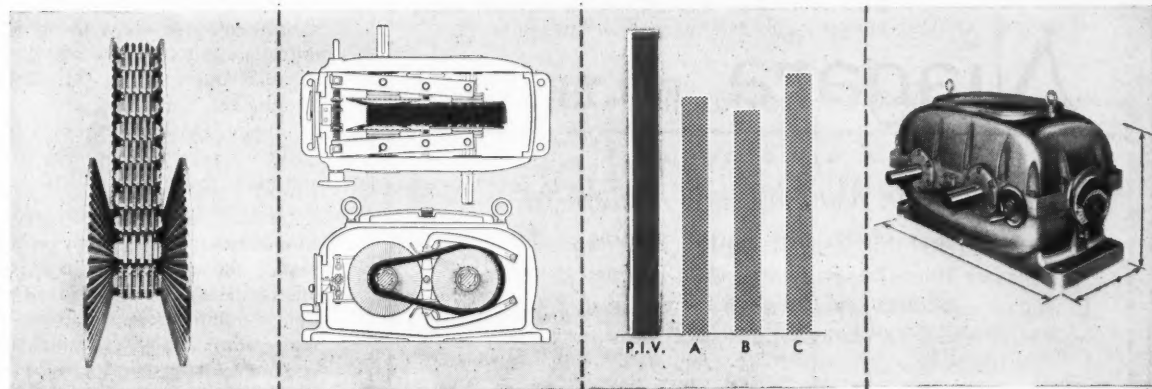
14,318



LONG-LIFE ACCURACY and application flexibility of Link-Belt P.I.V. are unmatched by any other variable speed drive. It's available in 8 sizes and 16 standard types, in capacities from $1/2$ to 25 hp—for horizontal or vertical mounting. Compact design simplifies

installation as a separate unit or a built-in part of a machine. Even greater application flexibility can be gained by making motor and helical gear sets integral parts of the P.I.V. Of all-metal construction, P.I.V. is totally enclosed, automatically lubricated.

How LINK-BELT P.I.V. differs from other variable speed drives



POSITIVE MESH of self tooth-forming chain with grooved wheels assures full-rated hp at output shaft. All-metal construction . . .

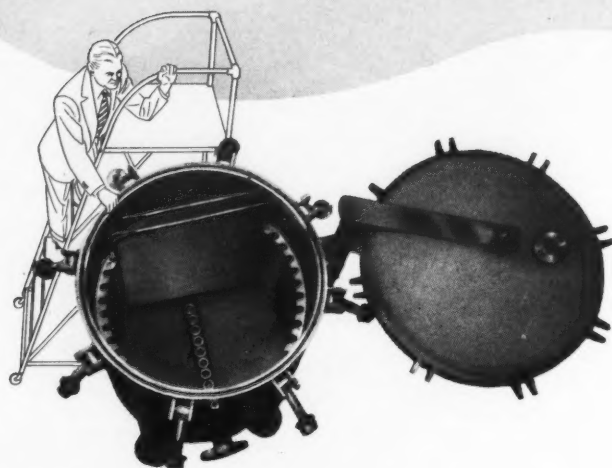
PREVENTS SLIPPAGE because the P.I.V. drive chain does not depend on friction and is unaffected by atmospheric conditions.

UNMATCHED ACCURACY is demonstrated by this actual comparison of maintained rpm of P.I.V. and three other variable speed drives.

GREATER COMPACTNESS results from short-center arrangement of drive mechanism. Some P.I.V. models save 50% on floor space.

When inquiring check 3368 opposite last page

HOW TO INCREASE the buying power of your filter dollar



Take a close look inside a Niagara Filter on the job and you'll see why it's your biggest dollar's worth. Look at its sturdy construction. Ask a user how long a Niagara Filter lasts . . . how little it costs per year. You'll find a Niagara lasts up to three times as long as a filter without this rugged construction and efficient design. So, your Niagara dollar buys *more*.

GET NAMES, DATA

Niagara FILTERS

A DIVISION OF
American Machine and Metals, Inc.

Dept. CP-557, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)

- ☐ Send me names of Niagara users nearby.
☐ Send complete data on Niagara Filters for filtering _____

NAME AND TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

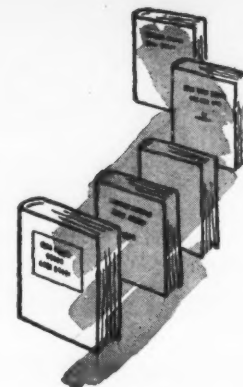
ZONE _____

STATE _____

SPECIALISTS IN LIQUID SOLIDS SEPARATION

When inquiring check 3369 opposite last page

Recent Books



An Introduction to Modern Organic Analysis

Reviewed by Dr. J. F. EASTHAM
University of Tennessee

This 250-page volume by Sidney Siggia and Hans J. Stolten of General Aniline & Film Company is a survey of methods of organic analysis commonly employed today. It is a practical book and is written so that any organic chemist can read it rapidly with understanding. Methods of analysis are not described so that one could go into the laboratory and practice them. Instead they are presented so that one can know what the methods will accomplish, when they can be applied, and what their limitations are.

These methods of organic analysis include the classical techniques such as qualitative tests for the elements, quantitative combustion analysis, functional group determination, cryoscopic measurements, refractive index and density determination, microscopy, and polarimetry. Also covered are the more modern techniques of Raman and absorption spectroscopy, X-ray and electron diffraction, mass spectrometry, potentiometric and amperometric titrimetry, and polarography. Some very recent innovations to organic analysis are omitted, such as nuclear magnetic-resonance measurements and high-frequency titrimetry, but little else is neglected.

In addition to the purely analytical techniques, the authors give us a good chapter on the closely related processes of separation — distillation, extraction, chromatography, ion exchange, and dialytic processes, and offer a practical chapter on typical problems which illustrate the interrelationship of various analytical techniques.

This book should be of great use to the practicing industrial organic or analytical chemist and should be particularly useful as a survey for one who has been away from the classroom for some time. In recent

years, industrial research divisions have become a coordinated grouping of specialized laboratories. The practicing synthetic chemist, for example, takes his crude product to one laboratory to have it distilled for him, to another to have it chromatographed, and to a third to have its ultraviolet absorption measured. The many specialized services have grown so that the practicing chemist can hardly name the operations that can be done for him, let alone appreciate their nature and their relationships to his problem. This book will help him to gain that appreciation.

To obtain "An Introduction to Modern Organic Analysis" remit \$4.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Avenue, New York 1, New York. When inquiring specify 3370 on form opposite last page.

Separation and Purification Part 1

This 873-page book is the second edition of Part I, Volume III of the 13-volume series, Technique of Organic Chemistry. This edition has been expanded, brought up to date, and a number of sections have been added.

Edited by Arnold Weissberger (Eastman Kodak Company), book has a total of 13 contributing editors. There are a total of six chapters. These are titled: 1) Diffusion Methods, 2) Laboratory Extraction and Countercurrent Distribution, 3) Crystallization and Recrystallization, 4) Centrifuging, 5) Filtration, 6) Solvent Removal, Evaporation, and Drying.

New sections added deal with thermal diffusion, barrier separation, zone electrophoresis, liquid-liquid extraction for increased quantities, and inclusion complexes.

Of definite value to the reader are the lists of references that appear throughout and at

**reviews of current technical and reference work
... summarized for you by authorities
in the field with the CP staff**

the end of each chapter. These are quite complete and deal with all phases of the subject chapter. The book is adequately illustrated and indexed. Considerable use is made of photographs. Book also includes cumulative author and subject index for the other volumes in the series.

To obtain "Part I, Separation and Purification" remit \$17.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Avenue, New York 1, New York. When inquiring reader may simply specify 3371 on form which is located opposite last page.

Treatise on Inorganic Chemistry, Vol. II

Reviewed by DR. LEONARD N. DEVONSHIRE
University of Alabama

Written by R. Remy, translated from the German by J. S. Anderson, and edited by J. Kleinberg, Volume II treats the subgroup elements of the periodic table and related topics in 828 pages. Main-group elements and related topics were presented in Volume I.

The intricate chemistry of the sub-group elements is organized in such a way that similarities and differences among the elements and groups are clearly indicated. Trends in physical and chemical properties as related to position in the periodic table are emphasized. Related general subjects on metals and intermetallic phases, geochemistry, colloids, kinetics and catalysis, non-aqueous solutions, and solid-state reactions are included in separate chapters.

Particularly noteworthy is the up-to-date treatment of nuclear chemistry in chapters on radioactivity and isotopy, isotopy of the stable elements, artificial radioactivity, and the transuranic elements. Recent rules for nomenclature, atomic electronic configurations, and suggestions for further reading are in appendix.

Translator, editor, and publisher have produced a valuable reference book incorporating authoritative coverage of the field by one close to German and French sources, while retaining desirable features of existing works. Professor Remy has expertly interwoven theoretical explanations which add to the logic and continuity of the presentation and help correlate facts in terms of modern concepts.

To obtain "Treatise on Inorganic Chemistry, Vol. II" remit \$17.75 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Avenue, New York 10, N. Y. When inquiring about manufacturer's product reader may simply specify 3372 on form which is located opposite last page.

Textbook of Polymer Chemistry

Although designed primarily as a graduate-level text, this 518-page volume gives a good resume on a very timely and important subject — the chemistry, physics, and technology of high polymers, both natural and synthetic. It is written in easy-to-understand style and is well organized, having been actually used and tested at the University of Delaware.

The book is divided into six parts. Basic concepts and background are given in the introductory portion. The others discuss physical chemistry, kinetics of polymerization, properties of plastics, properties of fibers, and properties of elastomers. Liberal use of charts, graphs, and photographs is made. The author, Fred W. Billmeyer Jr., is associated with the Polychemicals Department of DuPont and with the University of Delaware.

To obtain "Textbook of Polymer Chemistry" remit \$10.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N.Y. When inquiring specify 3373 on the convenient Reader Service slip which is located opposite last page.



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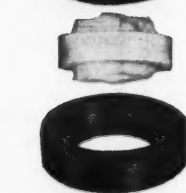
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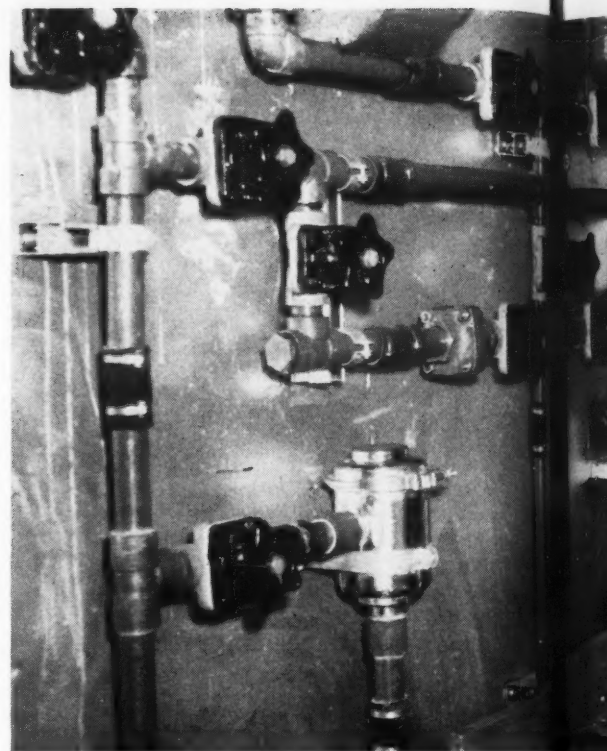
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When inquiring check 3375 opposite last page

corrosion control



Light, easily installed PVC pipe, valves, and fittings cut maintenance at Consolidated Film Industries' motion picture processing laboratory by resisting corrosive solutions

At Consolidated Film Industries, advanced film processing equipment for TV color kinescopes requires active hypo and developer solutions. Company saves weight, money, and maintenance time because...

rigid vinyl pipe prevents corrosion and contamination

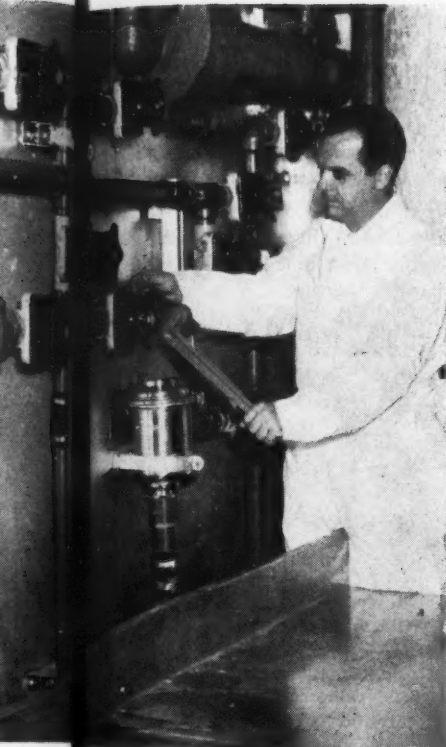
Contamination-free handling of active hypo and developer solutions is no problem for network of more than 1600 feet of rigid Koroseal polyvinyl chloride, thermoplastic pipe, valves, and fittings. Network is installed at Consolidated Film Industries' motion picture processing laboratory, Burbank, Calif. Cost of other materials which could withstand these severe service conditions was estimated at 10 times that of current installation.

Developer solution, maintained at 73°F, moves through pipe to a strainer which purifies corrosive liquid of undissolved chemicals, crystals, and foreign material. Solution discharges into developing cabinets through nozzles which spray film being processed.

Fixing bath consists of sodium thiosulfate, sodium sulfite, acetic acid, boric acid, alum, and water.

Pipe serves all sections of developing

CHEMICAL PROCESSING

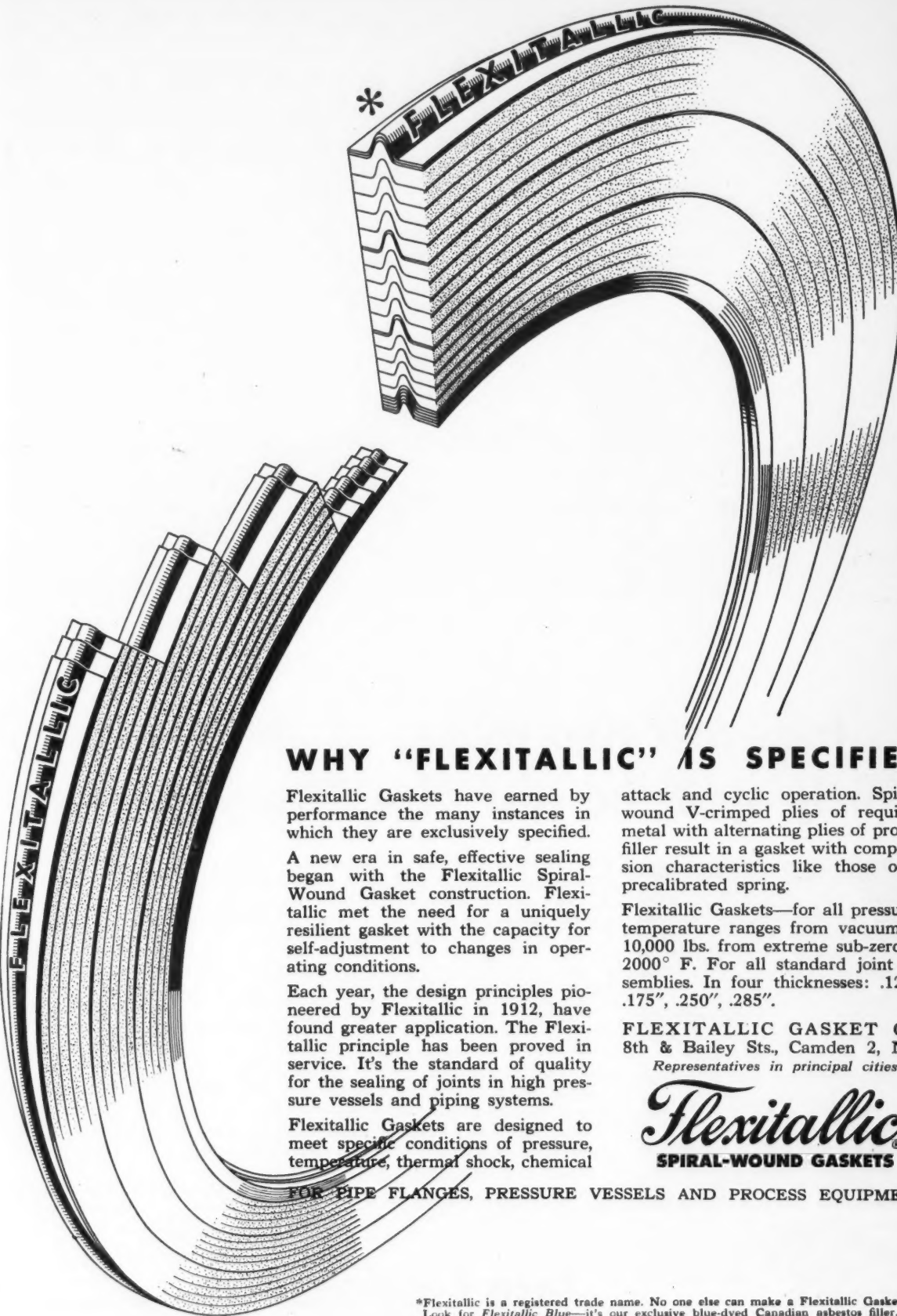


Under-floor network conducts corrosive fixing bath solution to processing cabinets on the left. There is no contamination of solution since vinyl does not react chemically

machine and carries, in addition to developer and fixer, water used for washing film during various stages of processing. Contamination is prevented since plastic pipe does not react chemically with the solutions.

Pipe diameters throughout network range from 1 to 1½" with 18 valves of equivalent sizes. Installation was simple and quick using same methods required with standard pipe. No special skill or tools are needed.

(Please turn to page 122)



WHY "FLEXITALLIC" IS SPECIFIED

Flexitallic Gaskets have earned by performance the many instances in which they are exclusively specified.

A new era in safe, effective sealing began with the Flexitallic Spiral-Wound Gasket construction. Flexitallic met the need for a uniquely resilient gasket with the capacity for self-adjustment to changes in operating conditions.

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FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue—it's our exclusive blue-dyed Canadian asbestos filler.

When inquiring check 3376 opposite last page



Here is a close-up of a 2-inch-wide ring roller made of cast "H" Monel alloy. Eighty of these rollers feed the hide-splitting machines used at Seton Leather Company, Newark,

N. J. They are cast at the Inco foundry . . . where castings of any practical design or shape are turned out clean as a whistle. Free from distortion. Close as to tolerance.

Inco-cast ring rollers of "H" Monel help split the cost of splitting leather



Workers at Seton Leather Company, feeding freshly tanned hide to the cutting blade between two rows of rollers. The bottom ring rollers are made of cast "H" Monel for long life.

Hides are split to proper thicknesses while still wet from liming baths. And this can cause trouble in the hide-splitting machines.

When made of brass, the ring rollers that guide the skins wear out fast. Often in 18 months or less. They just can't take the hard wear . . . the corrosive tanning chemicals.

What's more, downtime and replacement costs are only a part of the expense. Worst of all is the damage done to the skins by defective brass rollers . . . damage that doesn't show up till later processing.

Faced with this problem, Seton Leather Goods Company — a manufacturer of patent leather — came to Inco. Inco Development and Re-

search men recommended "H"* Monel hard corrosion-resisting nickel-copper cast alloy. Seton tried it: got rollers that last four to six years.

When you have a problem involving castings of corrosion-resisting alloys, get in touch with Inco. Perhaps "H" Monel or one of the seven other specially developed Inco-casting alloys is the answer for you, too. Each provides a combination of properties to meet special service conditions.

For complete information, write for Inco's new booklet, "Cast to Outlast."

*Registered trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.



Inco Castings . . . Sand, Centrifugal, Precision

When inquiring check 3377 opposite last page

CORROSION CONTROL

Aluminum-graphite coating can resist temperatures to 1000°F . . .

pigments used produce film 50% thicker than conventional paints

Uses: For the maintenance of smokestacks and other surfaces which are subjected to high temperatures.

Features: Pigments used in the coating produce a film about 50% thicker than that obtained with conventional heat-resisting coating.

Description: Coating, which combines graphite and aluminum, can withstand temperatures of almost 1000°F. Addition of graphite imparts resistance to thermal shock as well as weathering.

(No. 209 heat-resisting coating is product of Joseph Dixon Crucible Co., Dept. CP, Jersey City 3, N.J. . . . or for more information check 3378 on form opposite last page.)

Corrosion-resistant cements and coatings described

Series of bulletins lists features and uses of corrosion-resistant cement and coatings. Acid- and alkali-resistant cements for temperatures up to 1000°F are covered. Fast-drying corrosion-resistant primers for concrete, metal, and wood surfaces are also discussed.

Buls 101-106 are issued by Nukem Products Corp., Dept. CP, 111 Colgate Ave., Buffalo 20, N.Y. When inquiring specify 3379 on form opposite last page.



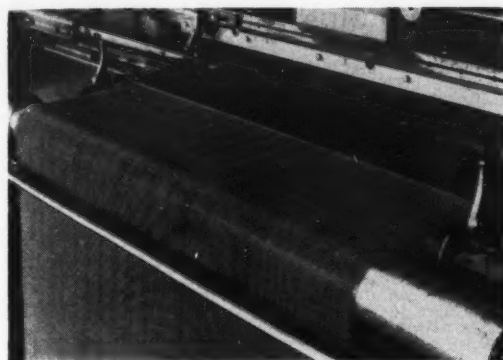
" . . . and these are the outdoor exposure racks!"

Titanium wire cloth available on production basis . . .

metal has excellent resistance to hypochlorite and chlorine dioxide bleaches

Uses: Product is finding applications for filtering assemblies, catalysts, screens, and in other equipment.

Features: Titanium has excellent resistance to a wide variety of corrosives. In the pulp and paper industry, titanium successfully withstands hypochlorite and chlorine dioxide bleaches.



Titanium wire cloth being manufactured

Description: Successful weaving of wire cloth requires wire with good elongation and uniformity of temper. Wire used has high corrosion resistance and formability. Purest and most ductile grades of titanium are used.

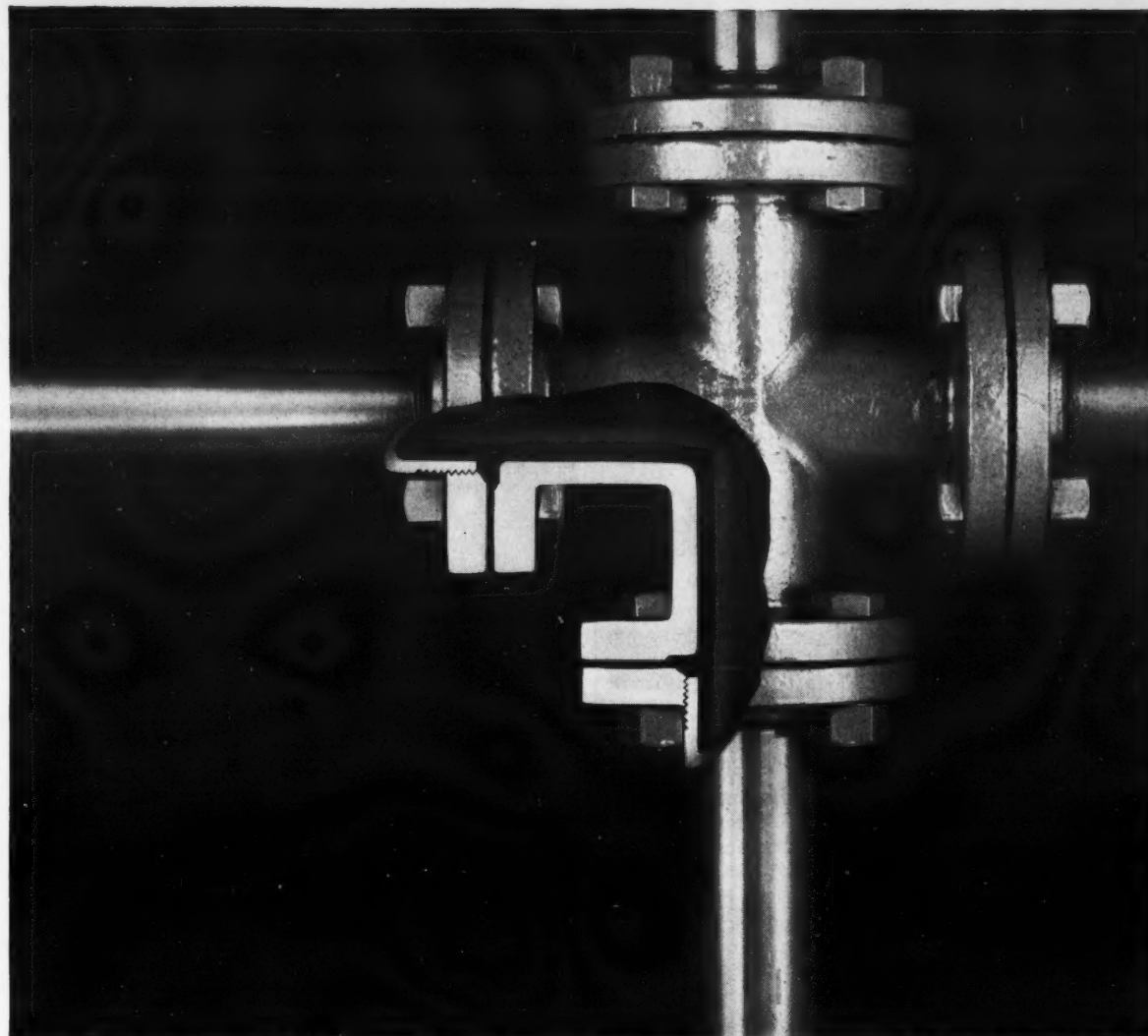
(Titanium wire cloth is being manufactured by Cambridge Wire Cloth Co., Dept. CP, Cambridge, Md. . . or for more information reader may simply check 3380 on the convenient Reader Service slip which is located opposite last page.)

(A-40 titanium wire used in wire cloth was furnished by Rem-Cru Titanium Inc., Dept. CP, Midland, Pa. . . or for more information check 3381 on the convenient Reader Service slip which is located opposite last page.)

Corrosion-resistant exhaust fan described in bulletin

Resin-bonded fiber glass exhaust fan for handling acidulous and other corrosive fumes is detailed in four-page bulletin. Construction features are discussed, and chemical resistance and physical properties are listed. Size table is accompanied by dimensional drawings.

Bul FI-511 is issued by Buffalo Forge Co., Dept. CP, Buffalo 5, N.Y. When inquiring specify 3382 on the convenient Reader Service slip which is located opposite last page.



Corrosive liquids flow from pipe through fittings or valves without touching metal in saran lined piping.

You can see why saran lined pipe stops shutdowns

It's corrosion-resistant saran locked within rigid non-bursting steel

By preventing corrosion, saran lined pipe can stop shutdowns—save labor costs and production loss.

Here is a pipe that resists commonly used acids, alkalies and many other corrosive liquids while having the strength of steel. It can withstand working pressures up to 300 psi. Cast iron and malleable iron fittings and valves are available for pressures up to 150 psi. If you have a high-pressure problem

in your operation, cast steel fittings and valves are available for pressures up to 300 psi.

You'll save labor costs, too, in fabrication. Saran lined pipe can be cut and threaded with conventional hand tools.

For tomorrow's protection today investigate saran lined pipe. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
Dept. SP1592B-1
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on saran lined pipe, fittings and valves.

Name _____ Title _____ Company _____
Address _____ City _____ State _____

YOU CAN DEPEND ON

DOW

When inquiring check 3383 opposite last page

Tells of impervious graphite cooler for large volumes of corrosives

Detailed specifications of various models of impervious graphite coolers for large volumes of corrosives are presented in eight-page bulletin. Diagrams, photographs, and cutaway drawings of equipment are included. Section of bulletin is devoted to step-by-step guide to aid in selection of correct model and size cooler for given application. Pressure drop calculations for each model are listed.

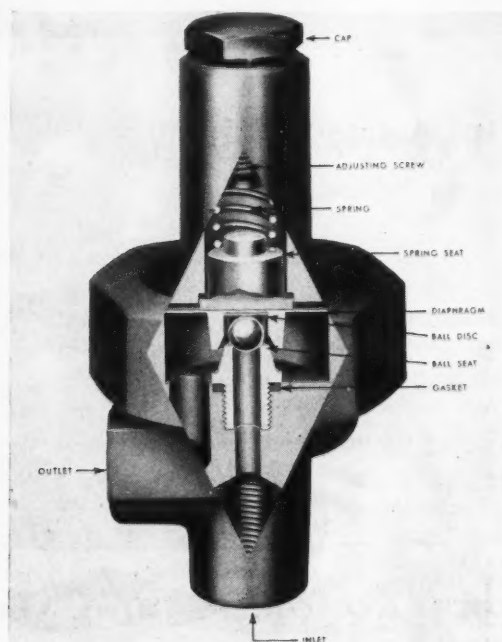
Bul 537 is issued by Falls Industries, Inc., Dept. CP, Aurora Rd., Solon, Ohio. When inquiring specify 3384 on form opposite last page.

Corrosive liquids to 1500 psi and temperatures to 250°F handled by relief valve . . .

number of corrosion-resistant alloys can be used in construction

Uses: For use with chemical feeding systems and a wide variety of other applications.

Features: Relief valve has a diaphragm protecting the spring and top works so that it can be used with corrosive liquids at pressures to 1500 psi and temperatures to 250°F. Valve is constructed so that it will not leak at processing pressures. Materials of construction include 316 stainless, Carpenter 20, or Hastelloy C.



Relief valve will not leak at processing pressures

Dallie diaphragm

HEAVY-DUTY DRIVE ASSEMBLY—Smooth, efficient, quiet running. Two drive reductions transmit ample power for all agitator needs and speeds. Tapered and radial roller bearings assure friction-free, straddle-mounting for pinion shaft. Heavy-duty gears, bearings and shafting—also available with gear head and variable speed motors. Protected by full-bath lubrication.

EXCLUSIVE ROTARY MECHANICAL SEAL—Superior for high-pressure or vacuum processing. (1) Eliminates leakage under pressure (toxic or explosive conditions) and reduces maintenance. (2) Permits efficient use of higher operating pressures... prevents metallic and catalytic contamination of vessel contents. Outstanding features: pre-loaded, double-tapered roller bearing, glass-coated gland insert, glass-coated agitator shaft and Teflon packing.

EXTRA-DEEP STUFFING BOX (not shown) is supplied as standard equipment. Exclusive design of 2-piece lantern ring minimizes maintenance. Glass-coated or alloy-packing plate fits tightly around agitator shaft. Latest packing materials and shrink-fit alloy sleeve for severe conditions are available.

NEW SWING CLAMPS ASSURE EVEN PRESSURE on both flanges—can't twist sideways . . . minimize danger of cracking glass. Clamp positions permanently on flange—can't be lost. Saves considerable time on process changeover.

CHOICE OF THREE BAFFLES—with restricted tips for handling great number of viscosities, specific gravities and particle sizes. (A) Spade-type baffle (B) Glass-lined tip which is an integral part of the baffle itself. (C) Removable alloy plug receives alloy tip whenever need arises.

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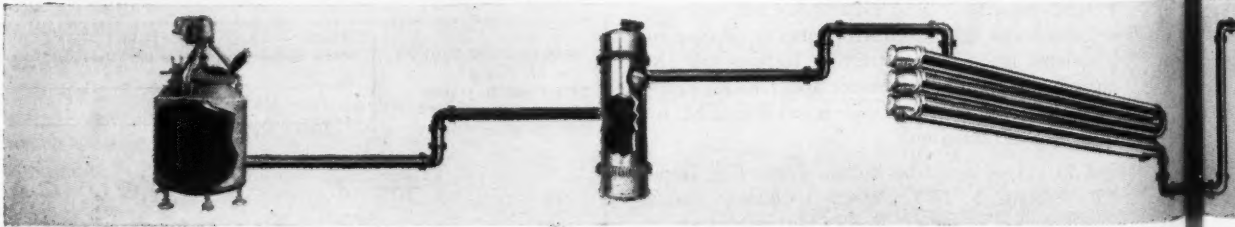
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GLASS-LINED REACTORS—Three types: HR, CR and SR. Custom-built up to 8,000 gallons. Standard units from stock range from 300 to 2000-gallon capacities.

GLASS-LINED COLUMNS—Standard and special packed units in glass-on steel or alloy metals. Built to your specifications in diameters up to 60 in.

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Glascote® glass-lined products

Stop corrosive attacks . . . help you increase yield thru zero contamination

Make Glascote chemical-resistant, acid-alkali glass your first line of offense against corrosion and contamination. An inventory of more than 3,000 glass formulas developed by Glascote and its parent organization, A. O. Smith Corporation, gives you the best in corrosion resistance and eliminates danger of metallic contamination.

Glascote offers you reactors, columns, storage tanks, rotary dryer-blenders, pipe and fittings — all glass-lined for processing a variety of corrosive materials with start-to-finish application versatility.

Glascote also offers you non-stick glass which is ideal for polymer production of all types.

Glascote clamp-top reactor, left, is typical of many products supplied for laboratory, pilot plant and full-scale commercial production, engineered and fabricated by Glascote to your exacting specifications.

Ask the representative who calls on you for all the facts about Glascote products — reactors, storage tanks, columns, conical rotary dryer-blenders, receivers, condensers and accessory products. Or, if you prefer, write direct. Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

Our standard one-year guarantee continues to apply to all Glascote glass-lined products.



Looks hard to manufacture, but Glascote skill makes it easy!

Superior knowledge of combining glass and steel qualifies Glascote to find quick, easy solutions to many process problems. This top head is typical. All told, there are nineteen 4-inch inlets. The manhole measures 24 inches in diameter.

Custom and standard reactors

Glascote reactors include designs in the HR (heavy-duty closed), CR (clamp-top) and SR (standard closed) series. Custom-built reactors available in capacities up to 8000 gallons dependent on design pressures. Standard units available from stock in a range from 300 to 2000 gallon capacities. ASME constructed.

..... A subsidiary of **A.O. Smith Corporation**

World's largest manufacturer of glass-lined steel products

GLASS-LINED STORAGE TANKS — Single shell horizontal types and vertical units available. Plain, jacketed, open and closed. Built to your specifications.

GLASS-LINED CONICAL, ROTARY DRYER-BLENDERS — Capacities 5, 35 and 110 cu. ft. as standard and larger on request. Pressures: tank full vacuum to 25 psi, jacket 65-75 psi.

GLASS-LINED PIPE AND FITTINGS — Available in 10-ft. lengths, fittings to ASME standards, in inside diameters from 1½ to 4 in. Six and eight inch and larger sizes to order.



When inquiring check 3385 opposite last page

Description: In operation, the line pressure acts against the ball check of the valve. The resulting force is opposed by spring compression. Whenever the line pressure reaches the set value, ball check of the relief valve raises from seat. Immediately line pressure acts against larger area of diaphragm, creating a force which props the valve wide open. After pressure is relieved, valve snaps shut.

Valve checks inherently provide tight shutoff, absence of chattering, snap-action, and high-volume relief at low pressures. Units offer a wide range of pressure settings which can be changed with a screwdriver. Internal parts can be cleaned or replaced without removing valve from the line.

Back-pressure valve which has the same features as the relief valve is also available. This unit is available for regulating back pressures to 200 psi.

(Relief valve and back-pressure valve are products of Milton Roy Company, Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. . . . or for more information reader may simply check 3386 on the convenient Reader Service slip opposite last page.)



" . . . if you're going to fill my shoes, you'll have to learn to take criticism."

News about

B.F. Goodrich Chemical raw materials



LOOK WHAT THEY'RE MOLDING IN GEON RIGID VINYL...

All parts shown made by Tube Turns Plastics, Inc.

Geon polyvinyl chloride rigid compounds are recognized as outstanding materials for piping and fittings. Geon offers high impact and tensile strength, and superior resistance to oils, acids, alkalis, and most chemicals.

These same rigid compounds are being molded into many complicated shapes and parts in addition to piping components. Geon can be used in designs utilizing very thin sidewalls as well as heavy sections. Holes, studs, and threads can be made integrally. Parts weighing several pounds can be molded in one shot.

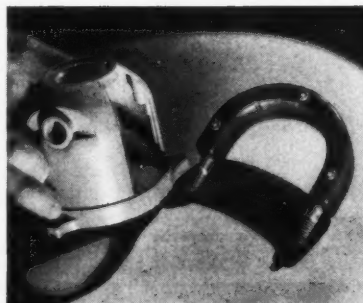
Despite design complexity, check Geon for strong, light, corrosion-resistant parts. For booklet on properties of rigid Geon compounds 8700A and 8750, write Dept. FJ-3, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



BIG FELLOWS include piping tee and motor housing, requiring heavy cross section, chemical inertness, dimensional stability. By contrast, molding for automobile dashboard has thin section, large projected area.



ELECTRICAL PARTS include fractional horsepower motor housing which reduces appliance weight, and hanger band for transformer with Geon molded around metal bolt. Geon has excellent dielectric properties.



AUTO HORN trumpet shows complicated contours possible in rigid Geon. Note very thin walls obtained in this high-impact material. Photos courtesy Tube Turns Plastics, Inc., Louisville, Ky.



GEON polyvinyl materials • NYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check 3387 opposite last page

CORROSION CONTROL

Chart lists liquid plastic coatings to meet variety of conditions

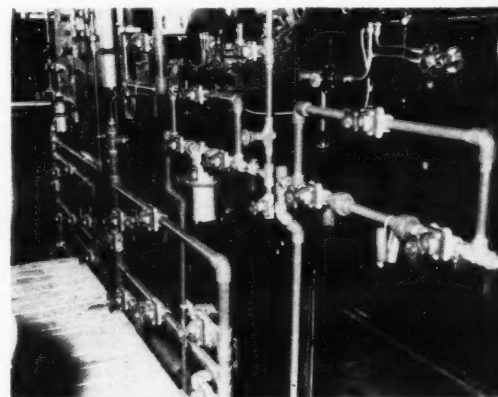
An aid to corrosion engineers in selection of proper plastic coating is provided by chart which recommends liquid plastic coatings for a variety of conditions. Chart contains comprehensive listing of architectural, industrial, and marine applications. Supplemental chart sets forth comparative performance under various conditions, application methods, costs, and other pertinent data of individual plastic coatings. Proper surface preparations and primers to be used in each instance are also shown. In most cases, a number of plastic coatings are recommended to provide diversification of finishes to suit all requirements.

Universal Pro-Coat Chart and supplement are issued by Protective Coatings, Inc., Dept. CP, 807 N. Fremont Ave., PO Box 2578, Tampa 1, Fla. Specify 3387A opposite last page.

Broad corrosion resistance advantage of PVC piping at film plant...

low cost, low maintenance, quick and easy changes also features

Excellent corrosion resistance to a wide variety of chemicals is one of the chief advantages of polyvinyl chloride piping system recently installed at Pathecolor, Inc., Bayonne, New Jersey. Chemicals handled at the plant consist of 5% potassium ferricyanide solution at 80°F, 1% sulfuric acid at



Control panel and replenishing panel for color film processing equipment showing some of PVC piping and fitting used at Pathe Industries

80°F, and 3 to 4% hydrobromic acid at room temperature. These solutions are handled in a 10,000 ft rigid unplasticized PVC pipe in the circulating and replenishing systems of the Kodachrome and Kodacolor processing machines and in the paper processing system as well.

CORROSION CONTROL

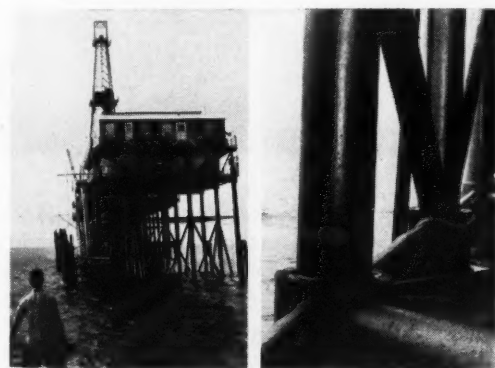
In addition to corrosion resistance, the PVC piping system has the advantage of permitting quick and easy piping changes when required. Low installation costs, low material costs, and low maintenance are other advantages. Absence of a plasticizer in the pipe eliminates danger of solution contamination.

(PVC piping is product of Alloy Tube Div., The Carpenter Steel Co., Dept. CP, Union, N.J. . . . or check 3388 on form opposite last page.)

Six-coat vinyl paint system withstands salt water and sea air . . .

Magnolia Petroleum Company uses coatings on offshore drilling rigs

Offshore drilling rigs on the Gulf of Mexico must withstand violent battering by hurricane winds and high waves as well as the effects of corrosive sea air. To protect these offshore structures, Magnolia Petroleum Company, at Morgan City, La., uses a six-coat system based on vinyl resins.



Left photo shows typical offshore drilling rig. At right is closeup of vinyl coating system on structure

Protective coating provided by these six coats of paint, covering an average of 30,000 square ft per structure, is about 0.006" thick. Paints were chosen for this service because of their elasticity and their resistance to abrasion, water, oil, and grease.

Eight men paint the entire structure in approximately three weeks using about 200 gallons of paint for each of the six coats in the system. There is no fixed repainting period.

(Vinyl resins used in paint system are a product of Bakelite Company, Div. of Union Carbon and Carbide Corp., Dept. CP, 260 Madison Ave., New York 16, N. Y. . . . or for more information check 3389 on form opposite last page.)

(Six-coat vinyl system was developed by Socony Paint Products Company, Dept. CP, Metuchen, N.J. Check 3390 on form opposite last page.)

Now! Automatic Quantity Control for Corrosive Liquids



All Stainless Steel Construction

"On the nose" measurement with smooth multi-stage shut-off

This efficient, Rockwell stainless steel meter-control system will save money for you who batch, blend or otherwise process foods, pharmaceuticals, chemicals, liquors, etc. It's immune to corrosive attack!

To operate you simply pre-set the quantity you wish to measure on the register. When this quantity has been reached, the flow stops. The automatic control valve is of the multi-stage type so the shut-off is made without hydraulic shock. Simple electrical controls are available for repetitive operation.

Rockwell also makes this automatic quantity control unit in bronze, steel or all-iron construction. Use the handy coupon for full details.



Rockwell **STAINLESS STEEL METERS** **with quantity control valve**

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ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pennsylvania

Gentlemen:

I am interested in measuring _____
(Name of liquid)

Pipe Size _____

Working Pressure _____ psi. Temperature _____ °F max.

Max. Flow Rate _____ gpm. Min. Flow Rate _____ gpm.

Your Name _____

Company _____

Street _____

City _____ Zone _____ State _____

When inquiring check 3391 opposite last page

CORROSION

Chemical-resistant chrome carbides . . .

coefficient of expansion relatively near to steel

Uses: For hot extrusion die inserts, trim for chemical process valves, rotary seal assemblies, and parts for high temperature service.

Features: Chromium carbides resist chemical attack over a wide range of temperatures. They have high hardness at room temperatures as well as at temperatures up to 2000°F.

Description: Recently issued patent covers the manufacture of two grades of chromium carbide with exceptional characteristics. Coefficient of expansion of materials is relatively nearer that of steel than conventional cemented carbides. Carbides have the ability to take an exceptionally fine finish.

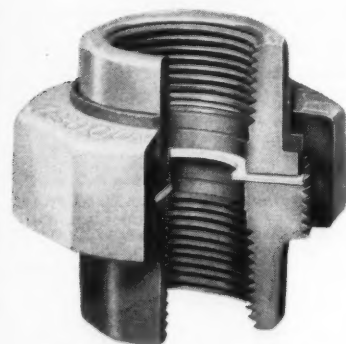
(Chromium carbide grades CR-1 and CR-2 are products of Firth Sterling, Inc., Dept. CP, 3113 Forbes St., Pittsburgh 30, Pa. . . . or check 3392 opposite last page.)

Electrolytic corrosion prevented by steel unions . . .

gasket which seals joint is made of Teflon

Uses: For preventing electrolytic corrosion due to flow of electric current along pipe lines.

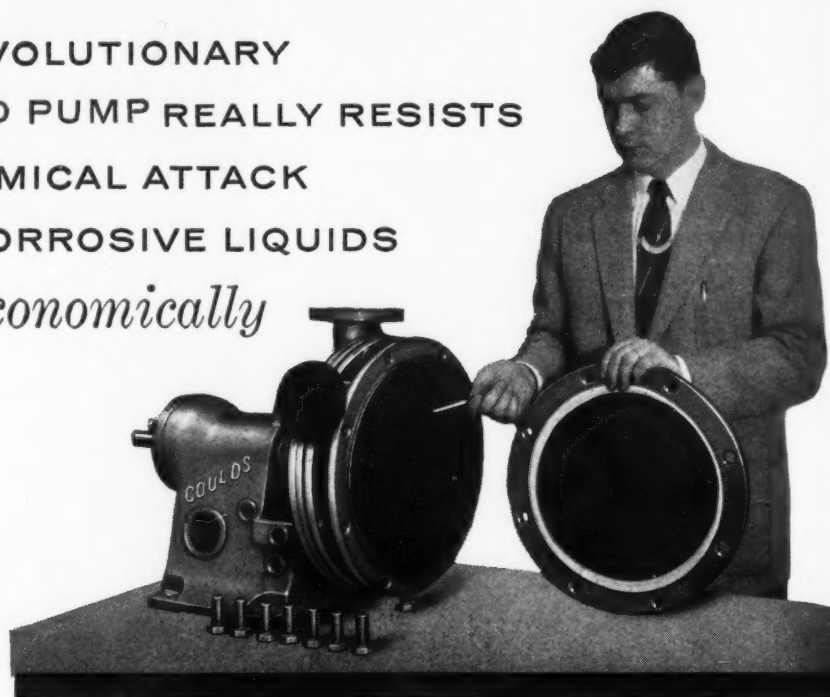
Features: Gasket which seals



Insulating union is made of corrosion-resistant plastics and carbon steel

now—pump corrosives

REVOLUTIONARY
NEW GLASSED PUMP REALLY RESISTS
CHEMICAL ATTACK
FROM CORROSIVE LIQUIDS
economically



Pumping has long been the unsolved problem in handling corrosive chemicals.

No more. Two companies have combined their skills to present the answer—a line of completely new centrifugal pumps, with the strength of metal plus the corrosion resistance of glass.

Last for years. Although considerably less expensive than some chemical pumps made of costly alloys, the new Goulds-Pfaunder *glassed* pumps have proved to be very durable. They stand up to most acids and alkalis for years—not months, *years*.

Unequaled resistance to corrosion. These remarkable new pumps resist corrosion just as laboratory glassware does. At room temperatures, the glassed surfaces of these pumps are completely inert to all common acids except hydrofluoric. Even at 212°F, all acids except hydrofluoric and concentrated phosphoric leave working surfaces unmarred.

The Goulds-Pfaunder pump is equally immune to the wearing action of all alkalis up to pH 12 at temperatures up to 212°F.

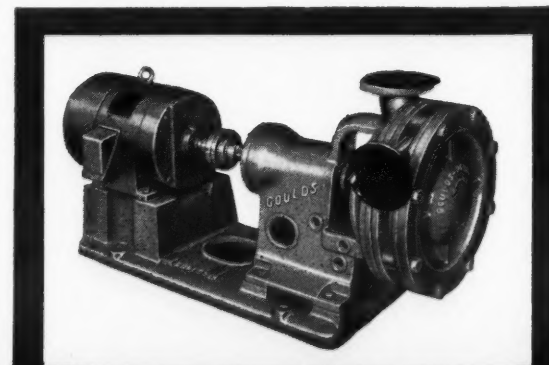
New concept brings new benefits. The new pumps have all the operating efficiency and maintenance economies that go with accepted centrifugal design.

The unique glassed surfaces provide advantages in addition to corrosion resistance. To many substances, glass is smoother than even highly polished metal surfaces. With such materials, flow characteristics are markedly improved in these new pumps.

Because glass is chemically inert, there can be no catalytic effect, no contamination. Cleaning is much easier.

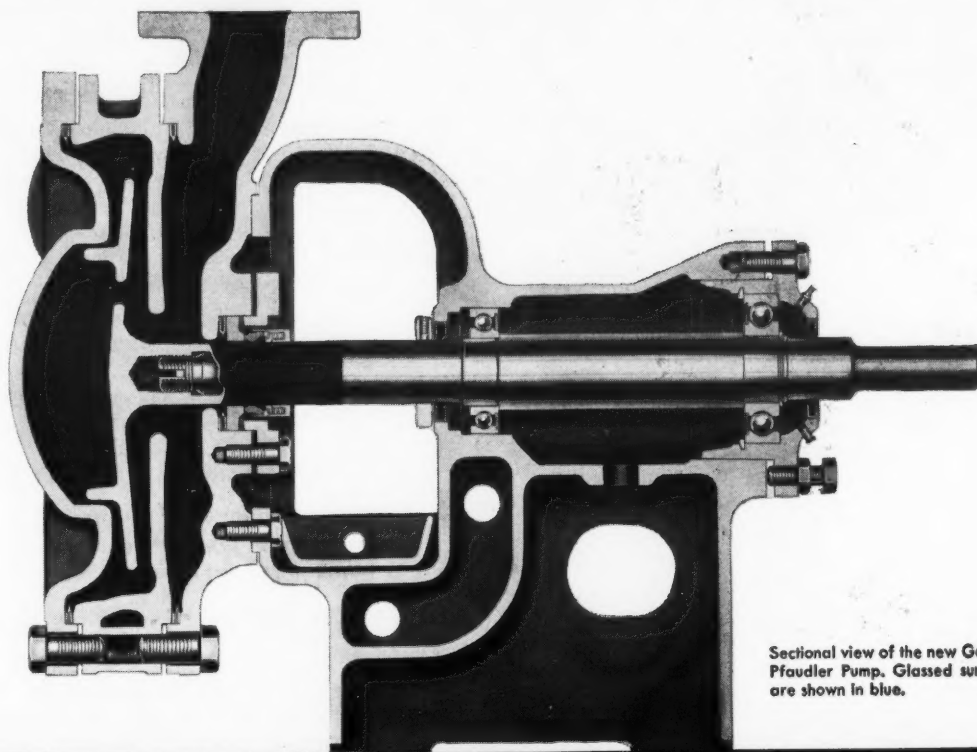
Long-sought solution. The Goulds-Pfaunder glassed pump is the result of over three years of mutual research and development by Goulds Pumps, Inc. and The Pfaunder Co. Goulds contributed its more-than-a-century's experience with pumps; Pfaunder added its special skill in the application of glass to metal.

Now, after exhaustive tests in service, the pumps are available to provide a number of operating advantages, together with the economies afforded by long, uninterrupted service.



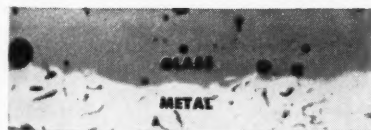
GOULDS-PFAUDLER
Glassed Pumps

s in glass



Sectional view of the new Goulds-Pfaudler Pump. Glassed surfaces are shown in blue.

THE GOULDS-PFAUDLER GLASSED PUMP How it's made—why it's better



Photomicrograph of glass-to-metal bond

Inseparable glass-to-metal bond. The glass that protects all pump surfaces exposed to corrosive liquids is *not* merely a glass lining. Repeated applications and firings fuse the glass to the metal chemically and bond it physically in such a way that separation is impossible. In one test glassed steel plates made in this manner were twisted 14° without damage to the glassed surface.

Glassed surfaces are tough. They can not be cracked or shattered by mechanical impact. Because of the interlocking chemical action between glass and metal at fusion temperature, fractures will not

"run" as they do, for example, in a window pane or a glass desk top. Consequently, sharp mechanical impact can cause damage *only at the point of impact*.

Resistant to thermal shock. The glassed surfaces normally withstand sudden temperature changes within a differential of 200°F, depending, of course, on operating conditions.

No side reaction or contamination. Unlike most metals, glass has no catalytic or contaminating effect in any known case.

No product adherence. Many polymers, plastics and synthetic rubbers, which cling readily to metal surfaces, will not stick to glass. Because even liquids with high adhesive characteristics slide past glassed surfaces easily, flow characteristics are greatly improved. The Goulds-Pfaudler Glassed Pump is *efficient*—and easily cleaned.

Very high resistance to corrosion. The pump handles all common acids (except hydrofluoric) and all alkalis up to pH 12—and handles them for long periods.

What do glassed pumps cost? The comparatively low cost of glass and the economy of the Goulds-Pfaudler fabrication method combine to make these pumps less expensive than others using special materials and methods to achieve a measure of corrosion resistance.

The first cost of a Goulds-Pfaudler Glassed Pump is likely to be less than you expect. The total cost—considering improved pumping efficiency and longer pump life—is almost certain to be lower than any you have paid in the past.

Size...Capacity...Head. You can choose from four different sizes of the Goulds-Pfaudler Glassed Pump, and get capacities up to 700 GPM... heads up to 140 ft.

Use the coupon for complete information, including performance curves.

union joint, and which is in contact with fluid in pipe, is made of Teflon. It is completely inert to most chemicals, has good heat resistance, and excellent insulating properties.

Description: Unions are manufactured in 3000-lb class, sizes 1/4 to 3" in screw-end and socket-welding types. Insulating sleeve separating tail piece and nut is made of fabric-reinforced phenolic resin.

(Insulating union is product of W-S Fittings Div., H. K. Porter Company, Inc., Dept. CP, Roselle, N. J. . . . or for more information reader may simply check 3393 on the convenient Reader Service slip which is located opposite last page.)

Film of 92-95% zinc applied to metals by brushing . . .

gives complete protection against rust

Uses: For protecting metal surfaces.

Features: Material can be cold-applied to metallic surfaces by brushing, even when the surfaces are moist, with complete assurance of protection against rust.

Description: The film deposited is 92-95% metallic zinc. Rust will not creep under the film. Metals that are coated with the product can be welded without difficulty. Method of suspension of zinc dust in the vehicle has much to do with the success of the product.

(Galvafruid zinc coating is product of W. G. Haddrell, Dept. CP, 583 Cabot Street, Beverly, Mass. . . . or for more information reader may simply check 3394 on the convenient Reader Service slip opposite last page.)

GOULDS PUMPS, INC., SENECA FALLS, N.Y. Main Office and Works

BRANCHES:

ATLANTA, 15 Peachtree Place, N. W.
BOSTON, Room 314, 1330 Beacon Street, Brookline, Mass.
CHICAGO, 53 West Jackson Blvd.
HOUSTON, 2314 Main Street
NEW YORK CITY, Room 1503, 11 Park Place
PHILADELPHIA, 2099 North 63rd Street
PITTSBURGH, Room 512, Bessemer Bldg., 104 — 6th Street
TULSA, 543 East Apache Street, P.O. Box 6157
West Coast Representative, GOULDS PUMPS Western, Inc.,
1919 N. W. Thurman St., Portland 9, Oregon.
Other representatives in all principal cities.

GOULDS PUMPS, INC. Dept. CP, Seneca Falls, N.Y.

Please send me Bulletin 725.2 on the new Goulds-Pfaudler Glassed Pump.



Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

For more information on product at left, specify 3395 . . . see information request blank opposite last page.



H. R. (RUSS) ARNOLD (right), Plant Engineer, Riegel Paper Co., Acme, N. C. Left, Clayton Heintz, Cooper Alloy Corp.

ARNOLD OF RIEGEL PAPER tells why he specifies COOPER ALLOY stainless steel valves

Q. Mr. Arnold, why do you buy Cooper Alloy valves?

A. Cooper Alloy's 35 years' experience in casting stainless steel exclusively, particularly qualifies them to handle our corrosion problems. With a toothache, we go to a dentist—so here too a specialist is required. This know-how shows up in design features which I find in combination nowhere else, assuring reliable performance and lowest maintenance. Some of the 10" OS&Y gate valves in the photo have been in service for years without repair.

Q. What are some of the design features you refer to?

A. The extra-deep stuffing box with unique square compres-

sion along with two-piece gland and centerless ground stem gives longer packing life. The yoke nut, replaceable without valve disassembly, and bowed yoke designed to relieve stress on operating threads in radical temperature change services, make for less maintenance and longer life.

Q. Are there any other reasons for buying Cooper Alloy?

A. Yes. In addition to good deliveries, I find the engineering counsel you give us most helpful. Also important in Cooper Alloy, we have a single source for valves and the wide variety of flanged, screwed, and welding fittings we require in stainless steel.

A VALVE DESIGNED FOR STAINLESS! The Cooper Alloy valve is not an adaptation of earlier brass or iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless*. To get the details, write today for your copy of our free 12-page folder "Valve Technical Data."

The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves and fittings, and can serve you promptly from local stocks.

COOPER & ALLOY

Corporation • Hillside, New Jersey
VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

When inquiring check 3396 opposite last page

CORROSION CONTROL

Rigid Vinyl Pipe

(Continued from page 113)

Film processing equipment handles black and white film, kinescope, or color kinescope on lenticular film.

In a second installation where color films are processed, recently-developed bleach solutions which attack materials normally used in film processing can be handled successfully by the PVC pipe. Steel tanks in which bleach is stored are covered inside and out with rigid vinyl sheet. Welded plastic sheeting prevents solution from attacking tanks. In some installations processing machine tanks themselves are made of rigid PVC sheet.

(Koroseal pipe, valves, fittings, and sheeting are products of B. F. Goodrich Industrial Products Co., Dept. CP, Akron, O. . . or for more information check 3397 on form opposite last page.)

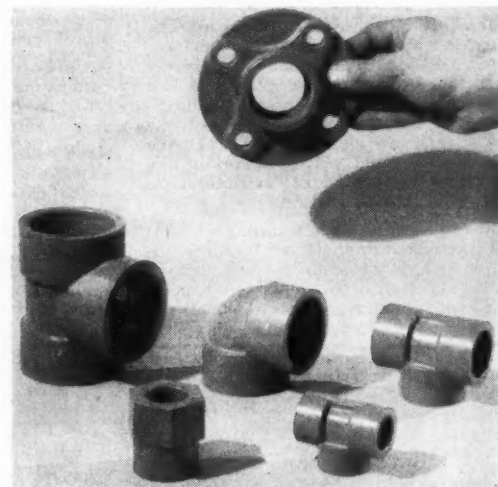
Paper-thin layer of plastic on inside of pipe fitting eliminates joint leaks . . .

permits joint to be made as strong as plastic pipe itself

A paper-thin layer of plastic on a section of the inside wall of a recently developed pipe fitting promises to do away with the problem of leaks at joints in cemented, or solvent-welded, plastic pipe installations.

The plastic layer, only a few thousandths of an inch thick, makes inner half of fitting slightly smaller than outside diameter of pipe it is used to join. Use of solvent-base cement softens plastic layer so the pipe can be pushed snugly into place.

(Please turn to page 123)



Plastic pipe fittings have a flared entrance, permitting pipe to be inserted quickly and easily

CHEMICAL PROCESSING

LESS MECHANICAL CLEANING, MORE ON STREAM TIME WITH UNITS TUBED WITH WOLVERINE TRUFIN® TYPE S/T

Concentration Unit Still On Stream After Two Years

With the passing of each day more and more evidence is accumulating to prove—very conclusively—that condensers and heat exchangers tubed with integrally finned condenser tube stay on stream for longer periods than those using plain tube.

Illustrated at the top right, for example, is the flow sheet of a gas concentration unit at a large midwest refinery. Five of its heat exchangers are tubed with Wolverine Trufin Type S/T—the integrally finned condenser tube. These units consist of a debutanizer bottom cooler, debutanizer overhead condenser (2 exchangers in parallel) and a high pressure cooler (2 exchangers in series).



WOLVERINE
TRUFIN

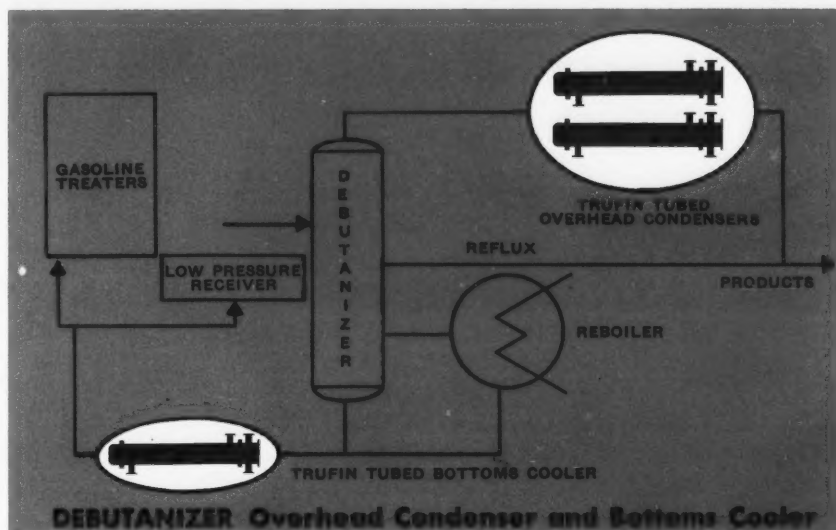
The units (tubed with Trufin Type S/T, 16 BWG admiralty brass condenser tubes), have been on stream for two full years without requiring mechanical cleaning on the shell side—and are still going strong.

In establishing the reasons for this resistance to fouling, engineers have discovered that the configuration of Trufin surface is apparently less conducive to scale build-up than bare tube. Scaling tends to follow the contour of the fins and does not accumulate preferentially between the fins but forms an extended projection of the fin. In many cases the tubes appear to be self shedding.

GET VALUABLE BOOK FREE

Detailed breakdowns in cost differentials between prime surface and integrally finned condenser tubes are graphically explained in Wolverine's new book "Comparative Heat Exchanger Costs".

Just off the press, this new book will be invaluable to design and processing engineers alike. It carries complete cost comparisons for the design of new heat exchangers and condensers as well as for the retubing of existing equipment. Write for your FREE copy.



DEBUTANIZER Overhead Condenser and Bottoms Cooler

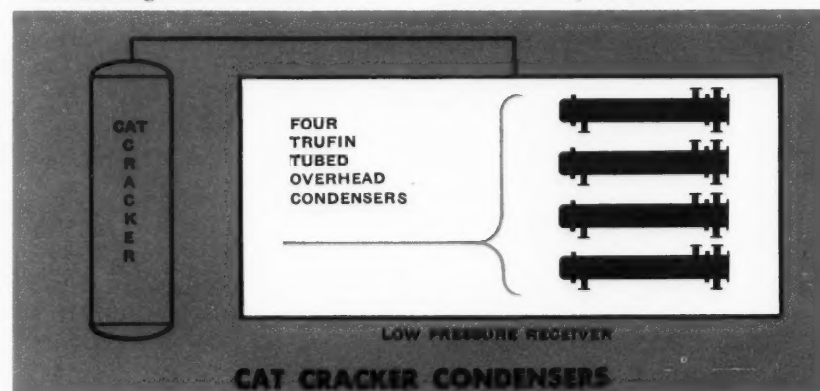
Trufin-Tubed Units For Cat Cracker Still Going Strong After Three Years

Still another authenticated example of outstanding performance by Wolverine Trufin Type S/T is found in the catalytic cracking unit of this same refinery.

This operation consists of four Trufin-tubed heat exchangers used in condensing-subcooling service for taking overhead vapors from the "cat" crackers. These exchangers have been on stream continuously for three years and to date have not required mechanical cleaning on the shell side.

In addition to increasing on stream time, Wolverine Trufin Type S/T also boosts heat transfer performance. Because of its extended surface, Type S/T has approximately 2½ times more surface area than does plain tube. The result is more BTU's extracted per foot of tube.

It is because of such features, for example, that the engineers in this particular refinery specify Wolverine Trufin Type S/T whenever possible. At present their use of Type S/T totals more than 100,000 linear feet.



Wolverine Trufin is available in Canada, through the Unifin Tube Company, London, Ontario.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA
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EQUIPMENT COMPANY LIMITED



WOLVERINE TUBE

Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.

Plants in Detroit, Michigan, and Decatur, Alabama. Sales Offices in Principal Cities
EXPORT DEPT., 13 E. 40TH ST., NEW YORK 16, N.Y.



TUBEMANSHIP: Means Top-Flight Condenser Tubing for Chemical and Petroleum Industries

By Ernest Dodd

Have you ever visited a modern tube mill—such as either of those operated by Wolverine Tube in Detroit, Michigan or Decatur, Alabama? It's quite an experience to see piercing mills, extrusion presses and giant draw benches producing gleaming aluminum and copper tube.

It's quite an experience also to talk to Wolverine employees—from the top brass in the front offices to the men that man the machines. It isn't long before you realize that here are men with great pride and single purpose in their work. You begin to recognize a certain something that they all have in common.

You discover that this mysterious "something" has a different meaning to everyone with whom you speak. To the setup man, for example, it's the delicate touch with which he adjusts a machine, while an inspector will tell you that it's the care with which he examines finished tube before releasing it to the customer.

The sales group will tell you it's the completeness of the product line while a plant manager will say that it's made up of facilities . . . things like plants and machines and manufacturing processes.

And, as you talk to all these people, something suddenly clicks . . . becomes crystal clear. You know what a Wolverine man or woman means when they mention "Tubemanship". It's a word that can be described differently by different people—yet have the same meaning to all.

Actually it's the same individual pride—deep within its people—that has made America and American industry great. At Wolverine they call it Tubemanship. It is your assurance of the finest tubing it is possible to make.

CALUMET & HECLA, INC.

CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA
OF CANADA LIMITED
CANADA VULCANIZER AND
EQUIPMENT COMPANY LIMITED

WOLVERINE HAS COMPLETE CONDENSER TUBE LINEUP

Processing engineers can specify Wolverine condenser tubing to meet every type of operating condition.

Wolverine prime surface tube, for example, is available in a wide range of sizes and alloys in both copper, copper base alloys and aluminum. If increased heat transfer capacity is a must, engineers can specify Wolverine Trufin®—the integrally finned condenser tube. Trufin is available in five distinct types with various fin spacings and heights. Depending on type, it can be specified in many sizes and alloys in copper, copper-base alloys, aluminum and electric-welded steel.

Where corrosion on both sides is encountered, Wolverine Duplex, in either integrally finned or prime surface form, can be specified. To speed re-tubing operations and reduce condenser tube inventories, Wolverine U-bend condenser tubes are recommended. These prefabricated condenser tubes are shipped in the exact order of their installation in disposable, box-type pallets.

FREE ENGINEERING HELP

Ready at all times to help customers solve tubing problems are the highly skilled members of Wolverine's Field Engineering Service. These tubing technicians will come up with the right answers to such tubing and heat transfer problems as corrosion, design, applications, etc. Next time you have a tubing problem—don't hesitate—ask for the services of a Wolverine Field Engineer.

WRITE FOR THIS NEW BOOK

The story of Wolverine Tube—its employees, facilities and products—is graphically told in Wolverine's newest book "The Measure of Tubemanship". Write today for your free copy.

WOLVERINE TUBE

Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.



Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

CORROSION CONTROL

(Continued from page 122)

plastic in the weld area has completely hardened, so the joint is as strong as the pipe itself.

Fitting has a flared entrance, leading to the narrow interior section, so pipe can be inserted quickly and easily. Fittings are made of a styrene-acrylonitrile blend.

(Uscoweld plastic pipe fittings are products of United States Rubber Company, Dept. CP, 1230 Avenue of the Americas, New York 20, N. Y. . . . or check 3398 on form opposite last page.)

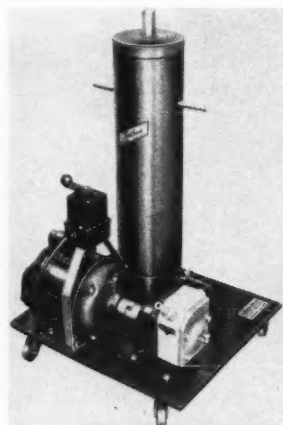
Self-priming filter pump uses Dynel filter medium

Uses: Unit is used specifically for handling electroplating and industrial oxidizing agents such as chromic, fluoboric, and nitric acids that are to be circulated and continuously filtered. It also withstands a variety of other corrosives.

Features: Unit can remove particles down to one micron in size from acid or alkaline solutions.

Description: Pump has a polyethylene body and Hypalon impeller.

It is self-priming, self-lubricating and will not leak. It is coupled by a flexible coupling to a 1/4 hp, totally-enclosed, ball-bearing motor. Capacity of pump is 50 to 300 gph. Filter chamber is fabricated of rigid polyvinyl chloride and contains two Dynel filter tubes. Dynel yarn is wound around cores of phenolic plastic to give fine filtration action. Dynel, the acid-resistant ac-



Pump can filter 50 to 300 gph of corrosives

rylic fiber, is resistant to corrosives encountered.

(Dynel filter medium is product of Textile Fibers Department, Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 East 42nd St., New York 17, N.Y. . . . or for more information check 3399 opp. last page.)

(Self-priming filter pump is product of Sethco Manufacturing Co., Dept. CP, 70-78 Willoughby Street, Brooklyn 1, N.Y. . . . or for more information check 3399A on form opposite last page.)

For more information on product advertised at left, specify 3400 . . . see information request blank opposite last page.



REMEMBER

June not too soon!
July stand by!
August look out!

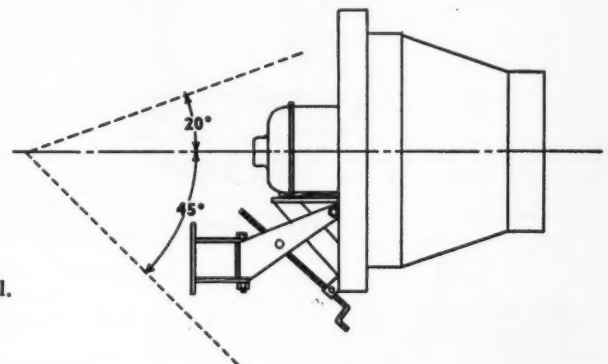
SOLVE AIR QUENCHING AND PRODUCTION COOLING PROBLEMS NOW...

WITH "Hy-V" AIR JETS

Mount up high off the floor . . . out of the way . . . on walls or columns. Then "Hy-V" Air Jets can't be damaged by trucks . . . cords can't be cut by wheels. These fan units jet a blast of cooling air up to 74 feet without ducts . . . can be depressed 45° and aimed left or right.

Use to cool production men exposed to heat from ovens, furnaces, forges or molten metal. Workmen become less fatigued, require less time out. But, don't wait for hot weather. Investigate now.

Air quench extrusions to improve physical properties. Speeds up production . . . cuts costs. Cools equipment too. Mail coupon today.



De Bothezat FANS
A DIVISION OF
American Machine and Metals, Inc.
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DeBOTHEZAT FANS DIVISION, DEPT. CPD-557
American Machine and Metals, Inc.
East Moline, Illinois

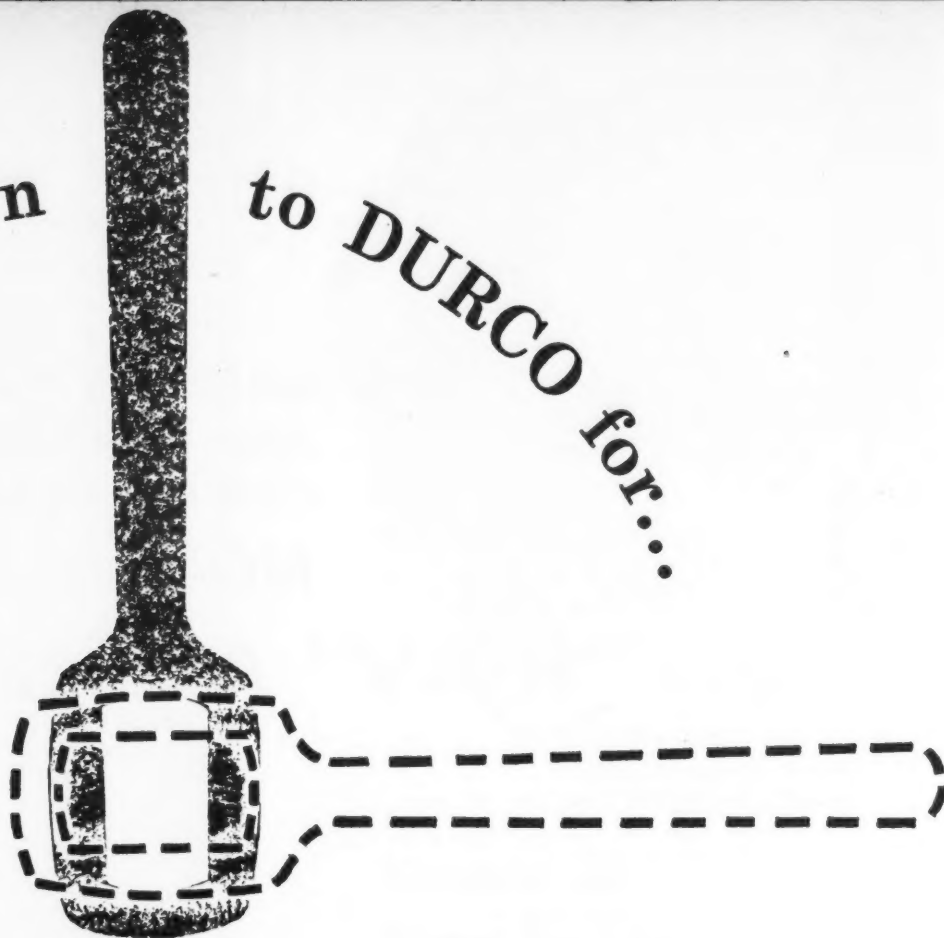
- ☐ Send bulletin containing complete data on "Hy-V" Air Jets.
☐ Have a DeBothezat representative call.

COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____
ATTENTION MR. _____

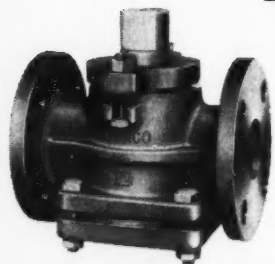
When inquiring check 3401 opposite last page

Turn

to DURCO for...



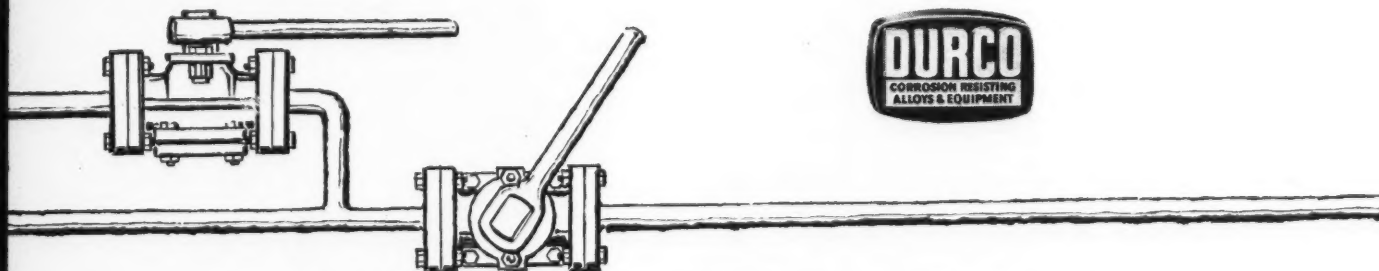
Industry's best chemical service valves



Durco Type F valves are available in 150# and 300# design, as well as three-way. Complete details in Durco Bulletin V/4b.

Durco Type F valves with Teflon sleeves have been proven in thousands of industry's toughest applications to be trouble-free, maintenance-free, and dependable.

Turn to the Durco Type F valve for non-sticking, non-lubricated, economical operation. For long life when handling severe corrosives, get Durco Type F valves. Available in a wide range of alloys in sizes to 3".



The DURIRON Company, Inc. / Dayton, Ohio

Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, and Pittsburgh

CORROSION

Shredded Teflon packing for acids, alkalis . . .

serviceable for temperatures from -150 to 500°F

Uses: Self-forming packing is excellent for emergency use against industrial acids, alkalis, and solvents.

Features: Packing is serviceable from -150 to 500°F and can be used on applications where packing materials require chemical resistance.



Corrosion-resistant packing

Description: Material is composed of shredded Teflon combined with suitable binders and lubricants extruded in an open cotton yarn jacket impregnated with graphite. Cotton jacket holds the material for ease of installation. It is also available in bulk form (shredded) that can be used for packing multi-size fittings and in applications where the need for rapid assembly prohibits the use of braided or extruded material.

(Plastic Teflon packing 403 is product of Abbott & Biddle, Dept. CP, 2417-X33 Federal Street, Philadelphia 46, Pennsylvania . . . or for more information concerning this product, reader may simply check 3402 on the convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify 3403 . . . see information request blank opposite last page.

CHEMICAL PROCESSING

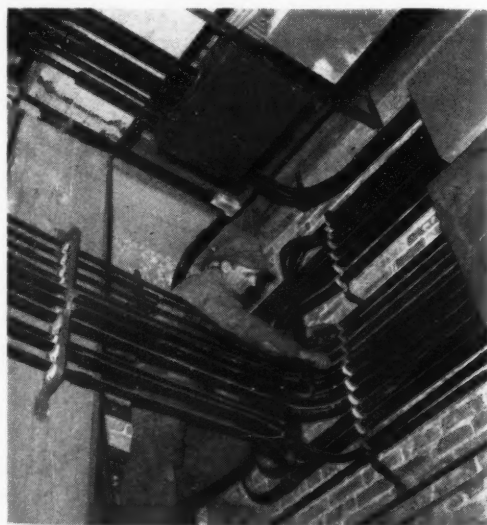
Polyethylene-coated steel conduit withstands sulfurous fumes at Charmin Paper

Lasts ten times as long as former heavy-wall steel tubing

Problem: At Charmin Paper Mills, Green Bay, Wisconsin, sulfurous acid fumes thrown off from mill's wood chip digester retorts combined with moisture to corrode standard heavy-wall steel conduit so badly in certain areas that it had to be renewed as often as every six months.

The Charmin mill produces paper products such as facial tissue, towels, and napkins by making logs into pulp, and converting the pulp into various types of paper. Troublesome area encompassed mill's bleached-pulp making operation. Using the sulfite process, wood chips are cooked in a sulfurous acid solution under high temperatures for prolonged periods.

Fumes emanating from this operation attacked and corroded the heavy-wall conduit in the area. A



Polyethylene-coated steel tube was easily installed at Charmin Paper

stepped-up maintenance program involved continual painting and repainting of the heavy-wall conduit. However, conduit still had to be replaced frequently. Even pin holes in conduit permitted the corrosive atmosphere to attack the insulation on wires inside the raceways, setting up an electrolytic action which helped speed up corrosion and interfered with conductivity. When heavy-wall conduit was replaced, essential lighting and power circuits were put out of action.

(Please turn to page 128)

Still Another AMERICAN First!

LIQUID

WINDSOR FELTS FOR FILTRATION

OUTLAST ALL OTHER FILTER MATERIALS 10 to 1

Windsor Felts are unique, fiber bonded, non-woven structures, engineered to serve as economical and efficient filter media for industrial processing. Quick facts:

- Greater product recovery
- Easy cake release
- Can be hosed off without taking from press
- Can be re-used indefinitely
- Produce less plugging
- Do not shrink, are ravel-free and produce clean-cut edges
- Reduce leakage
- Have unusual stability
- Temperatures to 250F

These outstanding properties make Windsor Felts highly suitable for use

on plate and frame, pressure leaf, rotary vacuum, cartridge or specialty filters.

The Engineering and Research Division invites your inquiry and will be pleased to work with you on your specific filtration problem and make recommendations.

For the newest in economical filter material send for Data Sheet #18 WINDSOR FELT-LIQUID FILTRATION, making request on your firm's letterhead.

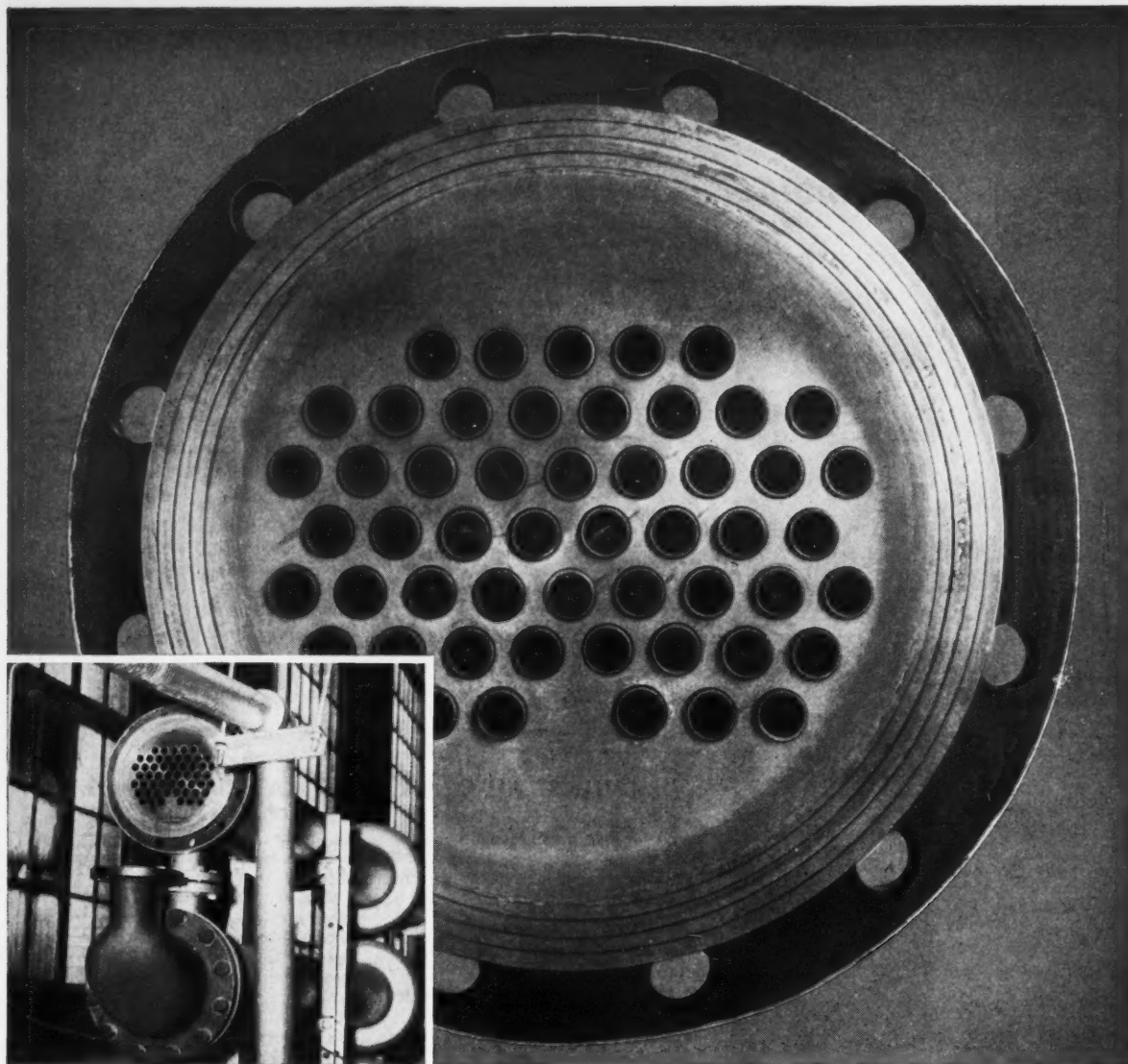


**American Felt
Company**
TRADE MARK

GENERAL OFFICES: 96 GLENVILLE ROAD, GLENVILLE, CONN.

SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Greenville, S.C., Dallas, Boynton Beach, Fla., San Francisco, Los Angeles, Portland, San Diego, Seattle, Montreal.—**PLANTS:** Glenville, Conn.; Franklin, Mass.; Newburg, N.Y.; Detroit, Mich.; Westerly, R.I.—**ENGINEERING AND RESEARCH LABORATORIES:** Glenville, Conn.

When inquiring check 3404 opposite last page



Carpenter 7Mo Stainless Tubing

No corrosion . . . no pitting after 4 years of handling hot SO₂ gases and vapors

• The smooth, clean surfaces of the Carpenter 7Mo Stainless tubing in this 3-pass Relief Gas Cooler tell the whole story. Still like new after 4 years of carrying 8% SO₂ gases and vapors from the top of a sulphite digester at temperatures in excess of 200°F. No maintenance. No replacement worries. No costly downtime.

If you have a tough corrosion problem involving stress corrosion cracking and pitting, see what Carpenter 7Mo Stainless Tubing and Pipe can do to solve it for good. Call your Carpenter Distributor for service that satisfies.

MEMBER  **The Carpenter Steel Company**
Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance 

Stainless Tubing & Pipe

When inquiring check 3405 opposite last page

CORROSION CONTROL

Thermoplastic lining material can be readily installed in field . . .

vinylidene chloride product has unusual resistance to broad range of chemicals

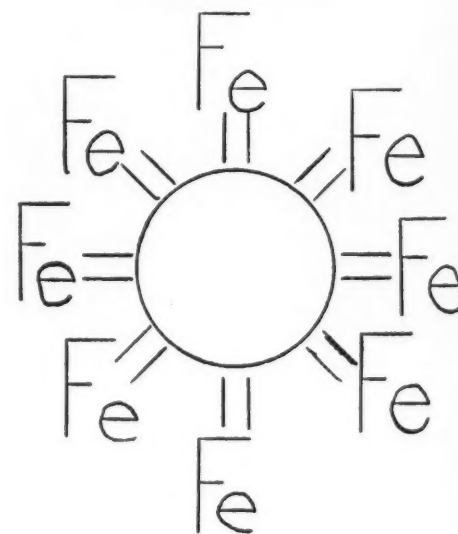
Uses: For lining processing and storage tanks, medium to large diameter pipes and fittings, fume ducts and hoods.

Features: Material, which is available in sheets, can be readily installed in the field or in applicator's plant by employing an adhesive system. Material has excellent resistance to a broad range of acids, alkalis, salt solutions, and solvents.

Description: Product is an elastomeric copolymer based on vinylidene chloride. Material is a flexible thermoplastic. There is no need for vulcanization after the material has been applied. It has good strength and abrasion resistance, will not support combustion, and has high elongation.

(For further information on Saraloy 898 lining material contact the Saran Lined Pipe Co., Dept. CP, 2415 Burdette Ave., Ferndale 20, Mich. . . or for more information check 3406 on form opposite last page.)

FERROUS WHEEL



Credit this one to Bernard Kerns, Gulf Research and Development Laboratories, Harnarville, Pa.

**Complete line of cementable
glass-cloth reinforced
Teflon tapes . . .**

have better abrasion resistance and superior mechanical properties

Uses: Tapes can be used in scrapers, seals, and as chemically inert liners for vats, hoppers, and other types of chemical containers.

Features: Reinforcement of tape with glass cloth gives it greater abrasion resistance, higher tensile strength, lower cold flow, improved dimensional stability, and superior mechanical properties.

Description: Availability of the tape in a glass-reinforced cementable form widens possible applications. Corrosion resistance and non-sticking qualities are of special value. Tape can be cemented to virtually any type of surface. Teflon tape is also available in the unsupported form.

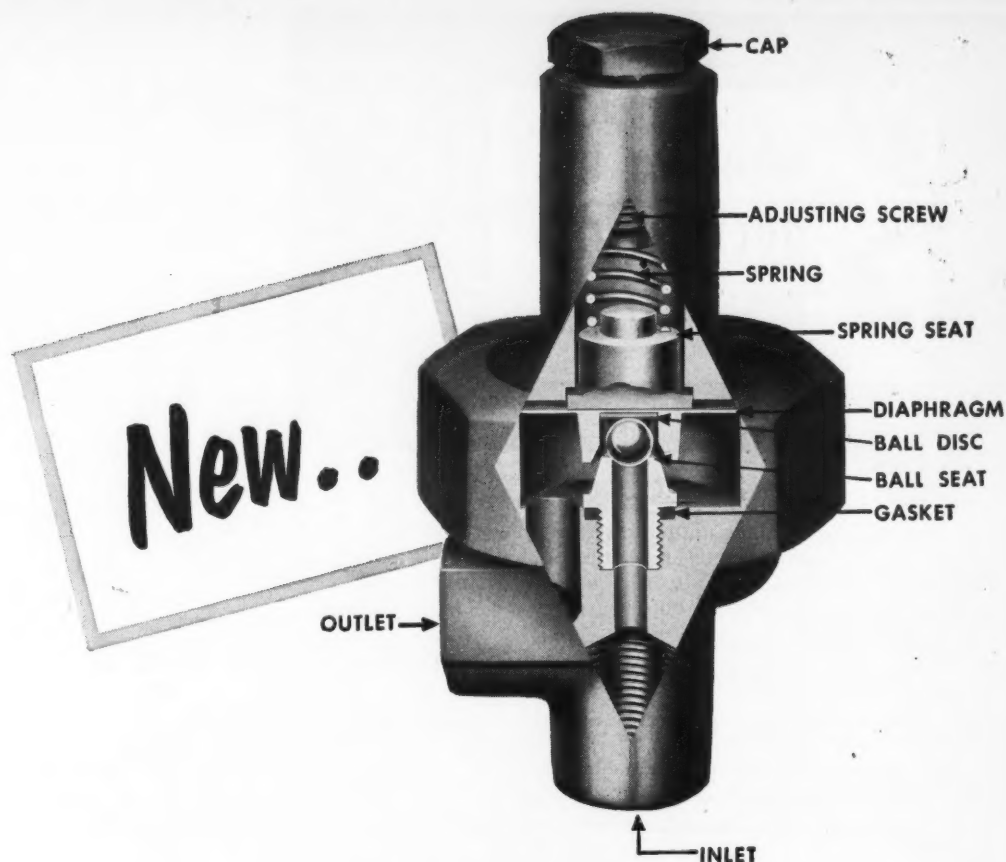
(Teflon tapes are available from Continental-Diamond Fibre Corp., Dept. CP., Newark, Del. . . . or for more information check 3407 on form opposite last page.)



**Polyester-glass tanks
for brine service**

Excellent resistance to the effects of brine and other corrosives is provided by polyester-glass tanks which are available in capacities up to 30,000 gallons. Plastic tanks are extremely light and easy to install.

(Polyester-glass tanks are product of Haveg Industries, Inc., Dept. CP, 900 Greenbank Road, Wilmington 8, Del. . . . or for more information check 3408 on form opposite last page.)



Leakproof, Corrosion-Resisting RELIEF VALVES and Back Pressure Valves . . .

Guard the accuracy of your Controlled Volume Pumps with these new *leakproof* Milton Roy Relief Valves. Ball checks tightly seal the valves against leakage. In operation, valves are either wide open or securely closed.

These field-proven valves are corrosion resistant. All metal parts that contact the liquid are made of stainless steel, Carpenter 20, or Hastelloy C. Topworks are isolated from the liquid by Teflon or Kel-F

diaphragms. Specify Milton Roy Relief Valves for any service at pressures to 1500 psi.

Corrosion-resistant Back Pressure Valves, with Teflon diaphragms, are available for service at pressures to 200 psi. Sizes: 1/4", 1/2", 3/4", 1".

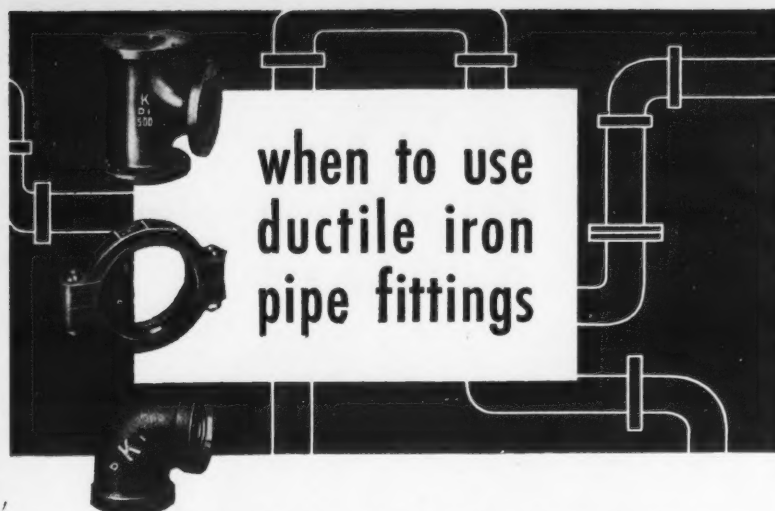
Write for Bulletin 357 for specifications and prices.

MILTON ROY COMPANY, Manufacturing Engineers,
1300 East Mermaid Lane, Philadelphia 18, Pa.

Engineering representatives in the United States, Canada,
Mexico, Europe, Asia, South America, Africa, Australia.



When inquiring check 3409 opposite last page



Because of their unique physical characteristics, including high tensile strength and the resistance to shock, rust and corrosion, Kuhns ductile iron pipe fittings are recommended for the following applications:

- Where structural strength is specified.
- When high pressure sealing is essential to reduce such hazards as explosion and fire.
- Where wide temperature fluctuations might cause distortion, leaks and weakness.
- When rust and corrosion are problems.
- Where fittings are to be reused.
- To prevent leakage because of vibration, misalignment or wear.

PHYSICAL PROPERTIES OF PIPE FITTING METALS

	Tensile Strength min. psi	Yield Strength min. psi	Elongation Per Cent
Ductile Iron	60,000	45,000	15%
Malleable Iron	40,000	30,000	5%
Carbon Steel	70,000	36,000	22%
Cast Iron	21,000	21,000	0%

As The Kuhns Brothers Company supplies cast iron and malleable iron fittings as well as ductile, these recommendations are made on an impartial basis.

Kuhns ductile iron screwed fittings are listed by Underwriters Laboratory, Chicago, for 300 lb. service; flanged fittings and companion flanges for 500 lb. service. They are easily identified by the "DI" on each.

DUCTILE IRON PIPE FITTINGS



1914
KUHNS BROTHERS COMPANY
DAYTON, OHIO

Pipe fittings of Ductile Iron, Cast Iron and Malleable Iron

THE KUHNS BROTHERS CO.

1800 McCall Street • Dayton 1, Ohio

When inquiring check 3410 opposite last page

CORROSION CONTROL

Coated Steel Conduit

(Continued from page 125)

Solution: Charmin engineers successfully experimented with 5000 feet of standard galvanized light-wall welded steel tube coated with a polyethylene armor. Installation was easy — conduit was bent by one man, as required, with a bending unit. Plastic-coated conduit required only simple compression couplings, each serving as a union. These were sealed by wrapping a double thickness of polyethylene or vinyl-back insulating tape around coupling.

Results: After six years of service, plastic-coated light-wall steel conduit has outlasted the former conduits ten to one. Since the original test installation, the mill has installed about 50,000 feet of the polyethylene-coated tubing.

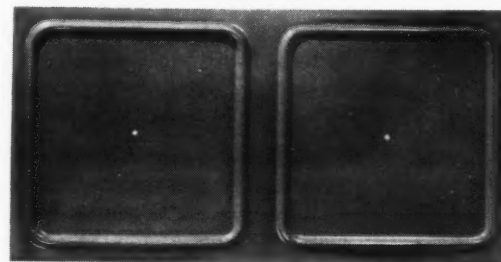
(Dekoron-coated tubing was furnished by Steel and Tubes Div., Republic Steel Corp., Dept. CP, 244 E. 131st St., Cleveland 8, Ohio . . . or for more information check 3411 opposite last page.)

Polyvinyl chloride tank liner allows for thermal compensation . . .

eliminates problems of buckling, warping, and other distortions

Uses: Expansion sheet can be used with tanks of wood, concrete, new or even badly corroded metal, or practically any other material. It can be used in any size tank.

Features: Expansion sheet is designed to absorb the expansion and contraction through the movement of corrugations built into the sheets.



Corrugations in tank liner are capable of absorbing much contraction and expansion

Description: Tank liner sheet is constructed of Boltaron 6200 unplasticized polyvinyl chloride. Individual sheets are 30x60x3/16".

(Tank liner sheet is product of H. N. Hartwell and Son, Inc., Dept. CP, Park Square Bldg., Boston 16, Mass. . . . or for more information check 3412 on form opposite last page.)

DOUBLE TROUBLE STOPPED by CHEMPRO TEFLON*

In high speed pumps handling highly corrosive chemicals, Chempro Teflon has drastically cut pump down-time caused by scored shafts and short packing life.

"Scored" Shafts

eliminated by using CHEMPRO TEFLON SEAL CAGES†. Last many times longer than metal lantern rings under continuous corrosive attack. Snap on and off shaft quickly and easily. No vibration at high speeds. Can stand high gland pressures.

† Patented



Short Packing Life

solved by using CHEMPRO TEFLON RING PACKINGS. Give months of leak-free service compared with days and even hours for conventional packings. Require only slight gland pressure. Low coefficient of friction often makes lubrication unnecessary.

Complete information given in Bulletin CP552



* duPont Trademark



9 Broadway, New York 4, N.Y.

When inquiring check 3413
opposite last page

CHEMICAL PROCESSING

**Corrosion-resistant flexible hose
withstands pressures to 3000 psi
and temperatures to 500°F . . .**

constructed of smooth Teflon tube with stainless wire-braided covering

Uses: Hose is suitable for handling chemical elements and compounds, corrosive vapors, foods and drugs, hot lacquers, steam, oils, and jet fuels.



High tensile strength of Teflon hose permits a smaller outside diameter, effecting a saving of both weight and space

Features: Hose is designed to withstand working pressures up to 3000 psi under certain temperature conditions, and temperatures to 500°F when working pressures are not above 1000 psi.

Description: Hose is constructed of smooth extruded Teflon tube, with a stainless steel wire-braided covering. High tensile strength of hose permits a small outside diameter, effecting a saving of both weight and space. Hose has high resistance to vibration. It is available in sizes from 3/16 to 1 1/8".

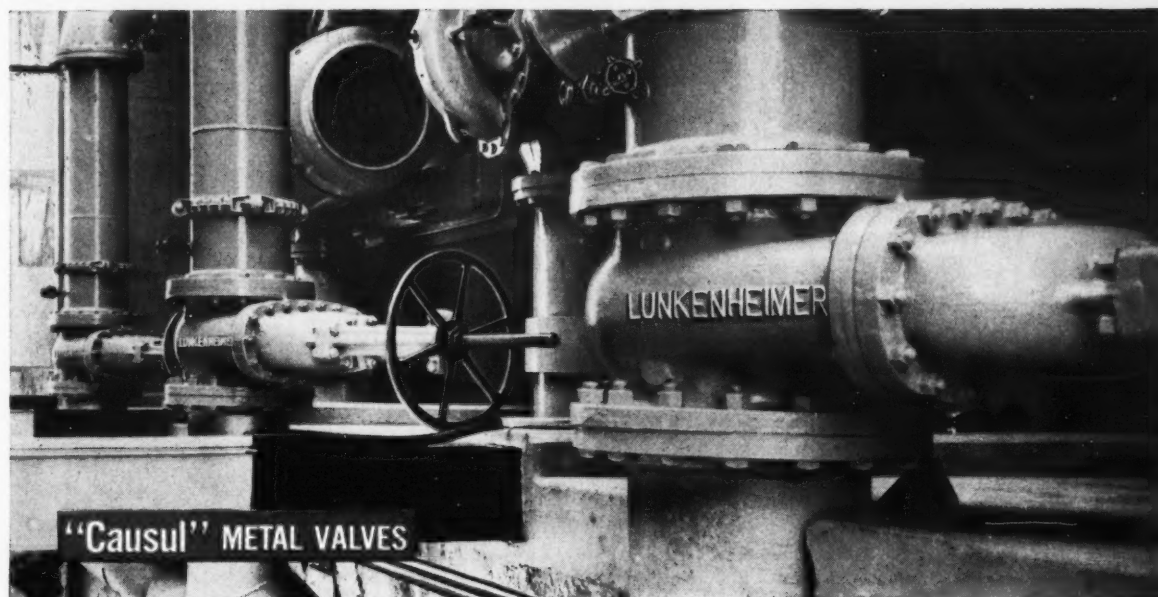
(Teflon hose is product of Flex-O-Tube Div., Flexonics Corp., Dept. CP, Maywood, Ill. . . or for more information check 3414 on form opposite last page.)

Have you wondered . . .

. . . why this magazine has a "different" shape? CP Art Editor Harley Lichtenberger reveals how the large page size allows "editorial landscaping" for most effective presentation.

. . . on page 213

Here's a balance between Economy and Corrosion Resistance that cuts your plant maintenance costs!



High alloys cost money—big money. They also offer the best corrosion-resistance you can buy. Ordinary iron or bronze, on the other hand, is inexpensive—but it can't hold up in corrosive service.

That means you need *balance*: a body and bonnet with *good* corrosion resistance at a reasonable price, and trim—where the most protection is needed—with *excellent* resistance. And that's the combination you have right here. "Causul" Metal, a Lunkenheimer exclusive, has much more resistance to corrosion than bronze or gray iron. At the same time, it's a lot less expen-

sive than the high alloys. And when you couple these bodies and bonnets with trim in Type 316 Stainless Steel or Monel Metal, you have a real money-saving combination for mildly corrosive service.

Today, the minute a maintenance man touches a wrench to a valve, its cost can double! Find out how you can cut these maintenance costs to rock-bottom with "Causul" Metal Valves.

Literature is available from your Lunkenheimer Distributor or The Lunkenheimer Co., Box 360, Annex Station, Cincinnati 14, Ohio.



Screwed Ends
Fig. 2008-8
(Monel trim)
Fig. 2008-4
(Stainless trim)
1/2 to 2 inches

Flanged Ends
Fig. 2009-8
(Monel trim)
Fig. 2009-4
(Stainless trim)
1 to 3 inches—
clip design
4-6-8 inches—
bolted design



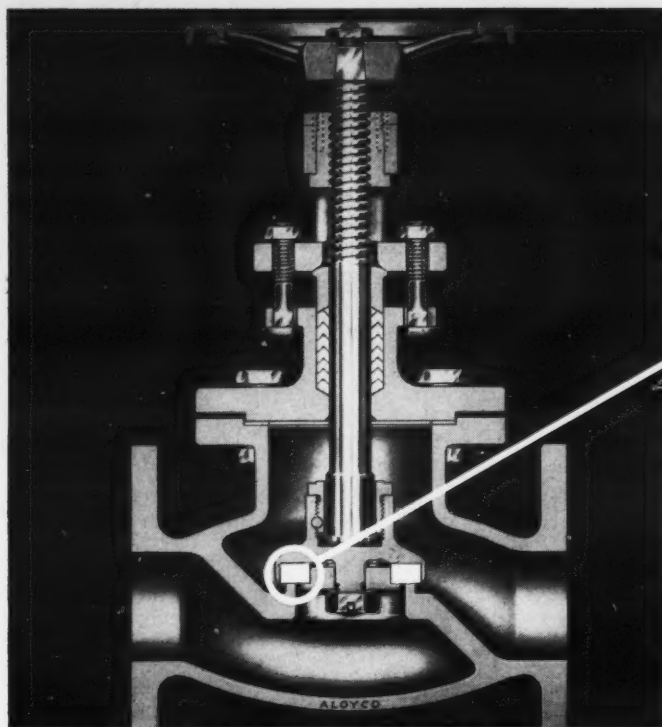
IRON • BRONZE • STEEL • PVC

L-251-29



LUNKENHEIMER®
THE ONE *Great* NAME IN VALVES

When inquiring check 3415 opposite last page



150 LB. ALOYCO GLOBE VALVE features bolted bonnet, and outside screw and yoke construction which keeps stem threads out of contact with corrosive fluids. Two piece gland plates and followers. Sound, heavy section body and bonnet castings. Stainless bolts. Heavy finished stem. Renewable yoke bushing. Flanged or screwed ends.

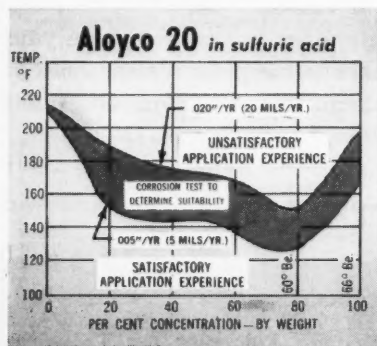
Tips on selecting valves to combat oxidizing solutions

High chromium and chromium-nickel stainless steels are the best alloys for these corrosive applications.

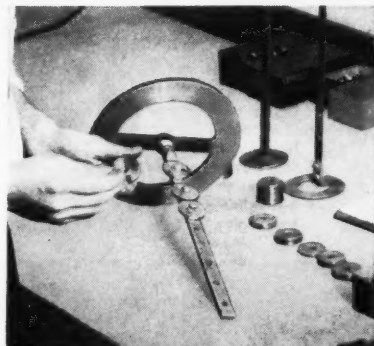
When exposed to oxidizing solutions they form protective films which restrain corrosive attack. Alloyco 18-8S, 18-8S mo and Alloyco 20 are good examples.

Valves should be constructed so that slight wear or corrosion won't require costly valve replacement. Renewable seats or discs shown above are one answer to this problem. So are deep stuffing boxes and outside screw and yoke construction. And, of course, all valve parts that come in contact with the corrosive fluid should be alloy steels.

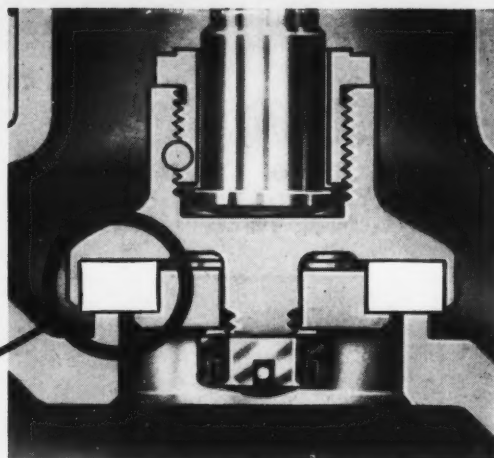
6.18



ALLOYCO 20 provides a high order of corrosion resistance to a wide range of sulfuric acid concentrations at varied temperatures as indicated by the graph above.



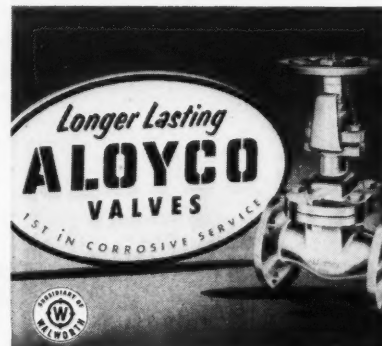
ALLOYCO TECHNICAL SERVICE includes engineering counsel, metallurgical assistance and field service. Samples are being prepared for plant line test above.



RENEWABLE TEFLON DISC is fully retained in disc holder so that even heavy overloads can't force it out of place. Machined seating surface assures wide full contact with disc and protects against distortion. Teflon V-type chevron packing rings are also used in deep stuffing box.



ALLOYCO STAINLESS STEEL 18-8S (type 304) is expressly suited for resistance to oxidizing solutions. It also lends itself to innumerable other applications to prevent product contamination or discoloration. In Alloyco 18-8S mo (type 316), molybdenum is added to increase resistance to attack by pitting.



FOR FURTHER INFORMATION on Alloyco corrosion-resistant valves, write to Alloy Steel Products Company, 1302 West Elizabeth Avenue, Linden, New Jersey.

CORROSION CONTROL

How PVC pipe and fittings cut cost of handling corrosive liquids . . .

initial cost, installation labor needed, and maintenance are all lower

Spent acids and other liquid wastes of industry are increasingly being drawn off more economically in polyvinyl chloride piping systems. The reasons for the switch to PVC drainage piping are:



Only a can of cement and a brush are needed to join PVC pipe and a socket-type fitting

1—Pipe and fittings made from polyvinyl chloride cost less than those made from conventional materials.

2—Less labor is required per joint with PVC. Recently a journeyman plumber joined a length of 2" Schedule 40 PVC pipe to a PVC socket-type drainage fitting in 56 seconds. Also, no fatiguing effort was involved in setting up or cementing the joint.

3—Fewer tools and materials are needed for PVC piping. Only a can of cement and a brush are used to join Schedule 40 PVC pipe and a socket-type fitting.

4—Fewer joints are required. Most commercial sizes of Schedule 40 polyvinyl chloride pipe are readily available in 10 and 20' lengths. This reduces the number of joints required.

5—PVC pipe and fittings are light, which makes them easy to transport and handle. In fact, PVC piping weighs only about 1/10 as much as some other types of piping.

6—Under normal circumstances, there are no losses due to breakage. PVC pipe and fittings have high impact strength and usually no allowance must be made for damage.

7—Unimpeded flow conditions are provided. In PVC lines that employ the socket-type drainage fitting, the bore at the joints is smooth. Not only

When inquiring check 3416 opposite last page

CORROSION CONTROL

is crevice corrosion avoided, but optimum flow conditions prevail as well.

8—PVC piping systems are durable. Solvent-welded joints hold tight under all stresses commonly imposed upon drainage systems. Piping is unaffected by ground conditions, whether acid or alkaline, wet or dry. PVC piping is not subject to galvanic or electrolytic action. It has non-aging characteristics and does not have to be painted.

(For further information on injection-molded PVC piping components, contact Tube Turns Plastics, Inc., Dept. CP, 2929 Magazine St., Louisville 11, Ky. Check 3417 on form opp. last page.)

Hypalon-based coating has high resistance to corrosion . . .

product has sufficient elasticity to withstand temperature extremes

Uses: For protection of buildings and equipment in refineries, chemical plants, and other locations where severe conditions present problems in maintenance of a coating.

Features: Coating forms a tough, resilient film which has excellent resistance to abrasion, weathering, and chemical corrosion. Coating has sufficient elasticity to withstand extremes of expansion or contraction without cracking and retains this property at temperatures as low as -40°F .

Description: Coating is based on chlorosulfonated polyethylene, which is known as Hypalon. This material is used in combination with silicone and other resins. Coating is resistant to oxidation, ozone, nitric acid, chromic acid, chlorine, caustic, alcohols, ethers, grease, and many other materials.

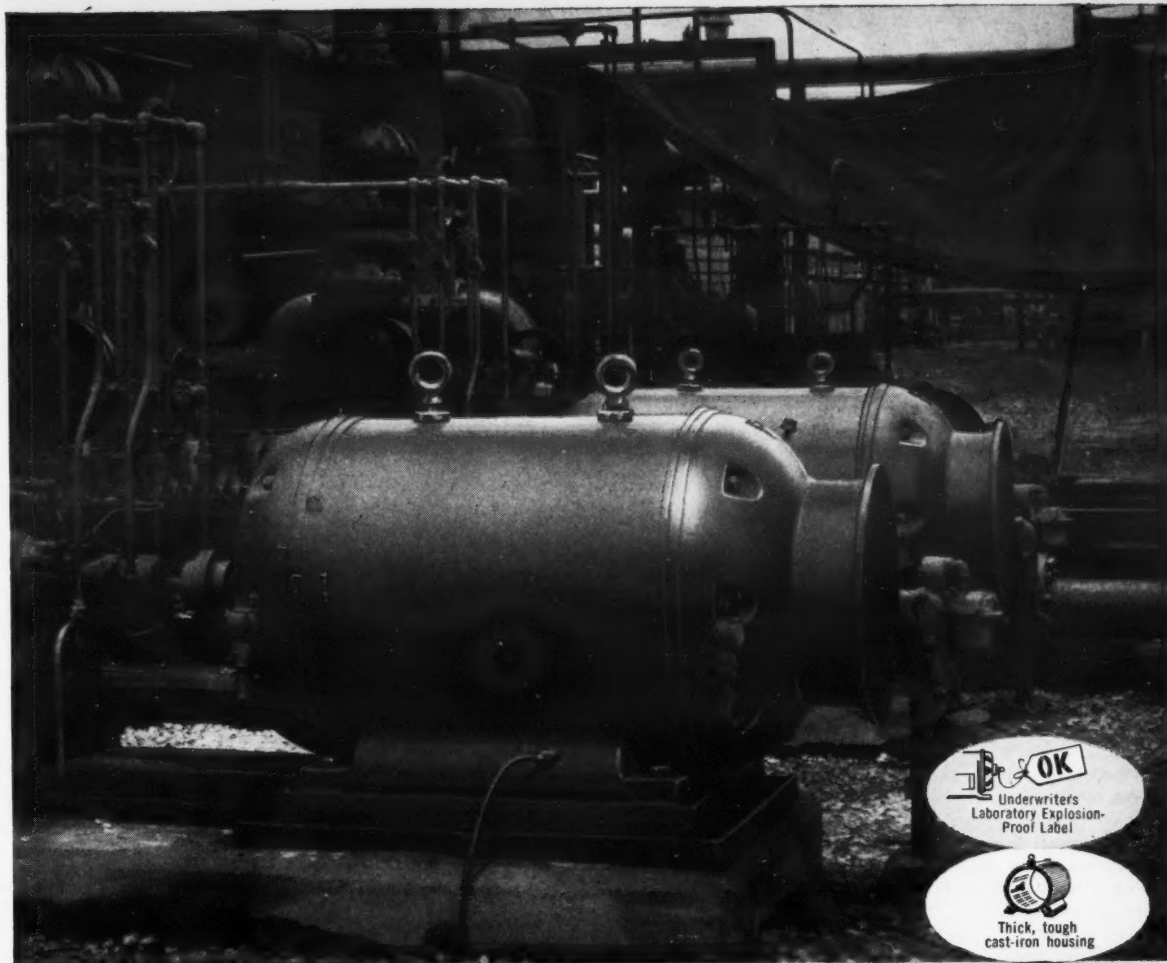
(Maintz protective coating is product of West Chester Chemical Co., Dept. CP, Box 39, West Chester, Pa. Check 3418 opposite last page.)

(Hypalon synthetic rubber is product of Elastomer Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Del. . . . or check 3419 on form opposite last page.)

Report discusses high-temperature and corrosion problems of steel

Use of steel and its alloys under high temperature and corrosive conditions is discussed in 8-page reprint of technical paper. Report includes mechanical and physical reactions of materials under various temperatures and corrosive environments.

Bul TR-544 is issued by Tubular Products Div., The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. Check 3420 opposite last page.



Tough-shelled, explosion-proof, and corrosion-resistant

New improvements in Louis Allis explosion-proof motors meet latest demands of abusive chemical service

You need tough-shelled, explosion-proof motors in the corrosive, volatile atmospheres of many of today's modern chemical processing plants.

For this rugged use, Louis Allis, the *originator* of the fan-cooled explosion-proof motor, has continued to develop new designs of direct benefit to the chemical industry: Cast-iron housings with extra-high corrosion-resistance—special varnishes that provide maximum insulation against moisture, acids, and alkali—more effective cooling with aerodynamically designed non-sparking fan.

EP-164

Now, to match increasing industry demands, Louis Allis offers explosion-proof motors in the *large* sizes — up to 600 horsepower.

What's more, these motors are available in a wide range of mechanical modifications and electrical characteristics to meet special requirements.

See the complete story in our Bulletin 800, "Explosion-Proof Motors." Contact your Louis Allis District Office, or write today to the Louis Allis Company, 448 East Stewart Street, Milwaukee 1, Wisconsin.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

When inquiring check 3421 opposite last page

DRY AIR...

PRECISELY as you want it

- ▶ to control your product's quality
- ▶ to prevent condensation on your product or material
- ▶ to prevent changes due to moist air in contact with your product
- ▶ to protect your material from dampness
- ▶ to protect your processing of moisture-sensitive material
- ▶ to DRY your material or product
- ▶ to pack or store your product safe from moisture damage
- ▶ to get exact moisture control for the precise atmosphere condition you need
- ▶ to provide precise atmospheric conditions for testing
- ▶ to increase your air conditioning capacity
- ▶ to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because ... it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because ... the absorbent is continuously re-concentrated automatically. No moisture-sensitive instruments are required to control your conditions.

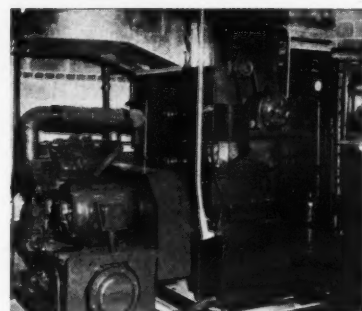
Most flexible because ... you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because ... the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because ... no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because ... no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

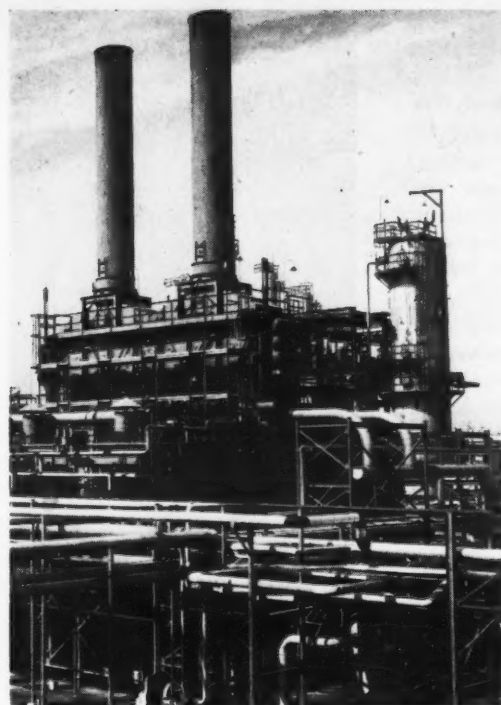
Write for full information; ask for Bulletins 112 and 121. Address Dept. CP-5

NIAGARA BLOWER COMPANY

405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

When inquiring check 3422 opposite last page



Double-fired vertical-tube design is used on this 18,000-bbl-per-stream-day Houdriformer charge heater (see table, top facing page) at Sun's Marcus Hook, Pa., refinery

Comparison of Design and Operating Data for Typical Double-fired Vertical Tube Heater

	Design	Actual
Radiant Section:		
Charge, lb/hr	156,200	186,500
Temp in, °F	760°	803°
Temp out, °F	970°	936°
Duty, MM Btu/hr	29,700	28,026
Rate, Btu/hr/sq ft	14,960	14,120
% extraction	61.7	58.9
Exit gas temp, °F	1395°	1520°
Convection Section:		
Duty, MM Btu/hr	9,220	10,764
Steam Generation, lb/hr	12,080	13,200
Rate, Btu/hr/sq ft	2,400	2,790
U, Btu/hr/sq ft/°F	4.8	4.8
Combustion:		
Fuel gas, scfh	67,100	33,570
Net heating value, Btu/cu/ft	680	1360
% excess air	15	21
Stack temp, °F	740°	722°
Overall:		
Heat release, MM Btu/hr	45,700	45,655
Air preheat, MM Btu/hr	2,320	2,038
TOTAL	48,020	47,693
% Efficiency	80.0	80.5
% Stack loss	17.3	16.5
% Setting loss	2.7	3.0*
	100.0	100.0

* Assumed

processing equipment

Offering process engineers more efficient use of costly radiant section tube surfaces, double-fired vertical-tube process heater . . .

cuts tube s

RALPH MORROW
Assistant Process Engineer
Engineering Division
Sun Oil Company, Philadelphia, Pa.

Higher efficiency at less cost is promised by a recent process heater development that uses only two-thirds the radiant tube surface required in conventional wall-tube heaters. Principle involved is double firing of vertically suspended tube banks. Several of the units are in successful operation at Sun Oil Company's Marcus Hook, Pa., refinery.

Process stream is heated entirely in the radiant section of the heater, where the tubes are arranged in banks or coils suspended in a vertical position. Horizontally mounted burners supplied with preheated air are located at several elevations midway between and on both sides of the tube banks. The direction of firing is in a plane parallel to and on both

sides of the banks of the process heater.

Since each of the tubes stands in the same vertical plane and receives an equal amount of heat from both sides, there is minimum variation in the circumferential heat density around the tubes. Also, because burners are located at several different elevations, the longitudinal variation in heat density along the tubes is negligible.

Convection section of the heater, which has a horizontal tube arrangement, is located on top of and lengthwise to the radiant section. Path of exit flue gases from firebox is upwards through convection section, discharging through two steel stacks. Convection section can generate 450 psig steam, part of which is used to

Description of 18,000-bbl-per-steam-day Houdriformer Charge Heater

Radiant Section

No. of tube banks	8
No. of tubes	112
Tube size	6x5"
Surface, sq ft	5725
No. of burners	80
Burner type	Nat. Airoil Oil & Gas
Length x Width x Height	42x42x33'
Firebox volume, cu ft	58,000

Convection Section

Bare surface, sq ft	4320
Extended surface, sq ft	11,200
Total	15,520

tube surface requirements 33 percent

supply burner-air preheat. Balance is used for other process requirements.

Tests have shown that on a conventional wall-tube heater, with tube spacing at two diameters, the ratio of maximum heat flux on the faces of the tubes to the average heat flux around the tubes is approximately 1.8 to 1. For double-fired tubes at the same spacing this ratio is reduced to about 1.2 to 1. Of greater im-

portance is the fact that the total effectiveness of the tube banks in a wall-tube design is found to be only 0.882 (i.e., 88.2 percent of a black body). Double firing of the vertical tube banks increases their effectiveness by almost 50 percent to a value of 1.314. It is this increase in effectiveness of the tube banks that permits a sizeable reduction in radiant surface requirements.

(Please turn to next page)

About the Author

Ralph Morrow is currently assistant process engineer in the process design section, Engineering Division, Manufacturing Department, Sun Oil Company. Before joining Sun he worked as project engineer with Foster-Wheeler Corporation from 1942 to 1951 — taking time out for a two-year hitch (1944-1946) in the US Navy. While with Foster-Wheeler, he spent three years in Europe as resident engineer erecting two large crude-distillation units. Born January 2, 1919, Mr. Morrow attended Drexel Institute of Technology in Philadelphia, receiving his B. S. degree in chemical engineering in June, 1942. Married and father of an eight-year old son, he lives in Upper Merion, Pa.



This Trap Would NEVER FREEZE!

● Anderson Quik-Flex Thermostatic Steam Traps are guaranteed freeze-proof! Ideal for tracer lines, meter boxes, and all outdoor steam processing found in chemical, refinery, etc. Made by the most famous name among steam trap manufacturers.



FREE
QUIK-FLEX
BULLETIN

THE V. D. ANDERSON COMPANY
division of International Basic Economy Corp.
1948 West 96th Street • Cleveland 2, Ohio
Please send your Bulletin 257 describing your Quik-Flex Steam Traps guaranteed freeze-proof.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

When inquiring check 3423 opposite last page



Fast, uniform heat dialed to your exact need with **CHROMALOX®** Electric Far-Infrared

Here are four quickly available, easily installed ways to end production delays, irregular product quality and other common problems caused by inadequate heat sources. With Chromalox Electric Far-Infrared, you get uniformly distributed heat at the right temperature for the work. No more stand-by losses, leaking lines, smoke, fumes or flames. It's cooler and cleaner for your workers, too.

Chromalox Electric Far-Infrared radiation is absorbed uniformly by practically all colors, even by transparent materials. Elements are self-cleaning and maintenance costs are a bare minimum. All-metal heaters are practically indestructible. With no need for stand-by heat and since heat is generated where used, all energy is utilized.

To get more information, call your Chromalox Representative or write us direct for the Bulletins listed. In addition, if you will tell us your problem, we will send you a case history of an identical or similar application.

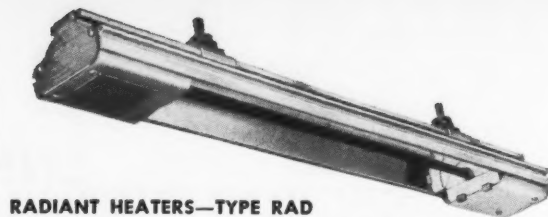
With Chromalox Electric Far-Infrared, you benefit in all these operations:

Annealing • Calendering • Curing
Degreasing • Dehydrating • Drying
Embossing • Food processing • Forming
Fusing • Heat sealing • Laminating
Molding • Paint baking • Planishing
Polishing • Resin finishing • Setting coatings • Shrink fitting • Weld preheating.



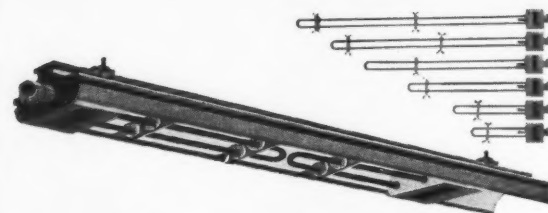
Edwin L. Wiegand Company
7517 Thomas Boulevard • Pittsburgh 8, Pa.

C-2181



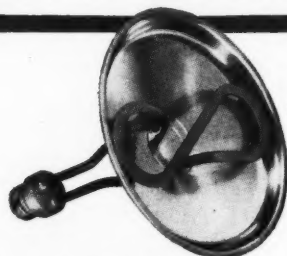
RADIANT HEATERS—TYPE RAD

For single assembly or in banks. Two bolts in sliding clamps facilitate mounting; two wires to connect. Six standard lengths, 14 standard wattages. Housing is rigid extruded aluminum with brightly polished parabolic non-oxidizing reflector. Write for Bulletin CS-604.



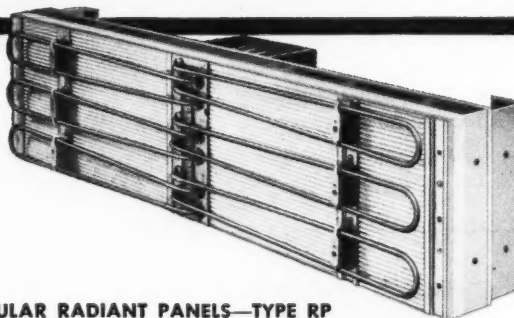
ADJUSTABLE AREA RADIANT HEATERS—TYPE U-RAD

Lets you match heat area to work area. Choose one basic housing to match your largest work. Into this housing install any of 6 different heaters to get up to 27 heated lengths as job sizes change. Bulletin CS-607



METARAY® LAMP REPLACERS—TYPE FRB

Now any infra-red reflector bank can be equipped with glassless, glareless, self-cleaning Metaray elements. Radiation is spread more uniformly from the larger element configuration. Write for Bulletin L-1104.



MODULAR RADIANT PANELS—TYPE RP

A high-intensity heat source in four standard sizes. Modular panels completely factory assembled with built-in continuous bus, reflector, insulation, frame and mounting. Lets you tailor heat source exactly to process requirements. Write for Bulletin CS-606.

THE RIGHT HEAT, EASILY DUPLICATED AT THE TURN OF A DIAL

Inexpensive, automatic input controllers provide accurate temperatures. As required by different work, heater input can be set anywhere from 4 to 100% of capacity. Better control, combined with better distribution, give more uniform product quality and higher production.

PROCESSING EQUIPMENT

Tube Surface

(Continued from preceding page)

For a given pressure drop and same maximum heat flux, tube wall temperature is lower in the double-fired tube arrangement than in a wall-tube design. This is because the mass velocity is greater, while tube travel is less.

Heater may be fired with either oil or gas. Burners may be individually controlled, or automatic instrumentation of whole banks of burners may be used.

One big advantage of the new design is the ease of making series-parallel coil arrangements. With proper attention to coil arrangement, any shape time-temperature curve may be obtained. Because the vertical tubes are suspended at the top and are merely guided at the bottom, they remain straight at high temperatures. This suspension-guide arrangement eliminates need for intermediate tube supports. Top tube sheets are made with slotted holes, which makes it possible to shop-fabricate and heat-treat the coils prior to installation in heater. Coils are easy to remove for replacement or repair.

(Double-fired vertical tube heaters were developed jointly by Engineering Division, Sun Oil Company, and the Alcorn Combustion Company, Dept. CP, 1505 Race St., Philadelphia, Pa. . . . or for more information check 3425 on form which is located opposite last page.)

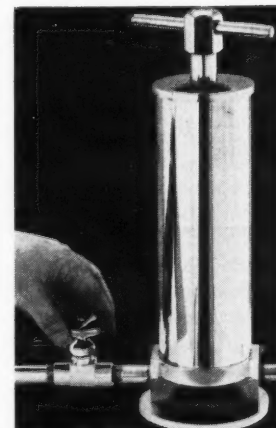
With capacities of 3 to 10 gpm filter unit removes particles as small as 0.1 micron

Uses: Removing minute particles from water.

Features: Filter cartridges remove solids as small as 0.1 micron.

Description: Permanent cartridge makes possible production of physically pure water at flow rates of from 3 to 10 gpm. Impurities larger than rated densities of cartridges are removed. Cartridges are available in densities to 25, 10, 1, and 0.1 microns.

(Heico MIK filtration unit is product of Heico, Inc., Dept. CP, 25 N. 6th St., Stroudsburg, Pa. . . . or for more information check 3426 on form opposite last page.)



Filter unit supplies physically pure water

When inquiring check 3424 opposite last page

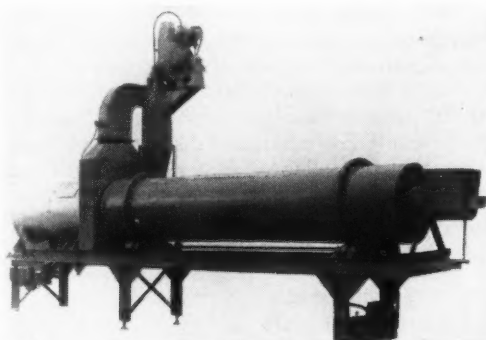
CHEMICAL PROCESSING

**No direct flame impingement
and only minimum fine losses
with dual-flow dryer**

Uses: Drying granular materials.

Features: Concentric fire-tube design causes gases to travel full length of the dryer before making contact with feed. This prevents any direct flame impingement and permits indirect heating by radiation. Direct heating is by hot gases only. Entire system is under slight negative pressure, keeping fine losses to a minimum.

Description: Dual-flow rotary dryers consist of concentric steel tubes with outer shell lined with flights specifically designed to pour feed over the radiant inner shell while presenting a curtain to the hot gases.



Dryer's entire system is maintained under slight negative pressure

Two size units are available. Capacity (rated on silica sand with 10% moisture) is one and two tons, respectively, per hour of dry product. Small unit will evaporate 200 lb water per hr. Larger dryer is rated at 400 lb per hr. Units come complete with oil burner, primary air blower, automatic temperature control, indicating pyrometer, exhaust blower, dust cyclone, positive displacement feeder, and gear motor drive.

(Dual-flow Rotary Dryers are product of Carpco Manufacturing, Inc., Dept. CP, Jacksonville 6, Florida. Check 3427 on form opposite last page.)

Details vibrating screen features, describes proper selection

Construction features of two models of vibrating screens for handling feed up to 6 or 20 inches, and coal or ore up to 8 or 24 inches, are detailed in 24-page bulletin. Drawings show installation methods in detail. Information on how to select a vibrating screen is provided.

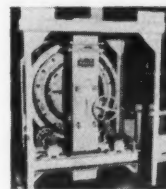
Bul 07B6151D is issued by Allis-Chalmers Manufacturing Company, Dept. CP, 1151 S. 70th St., Milwaukee, Wis. Check 3428 opp. last page.

HIGHLY INTIMATE BLENDS IN 3 TO 5 MINUTES

Sturtevant blending continues during discharge - no segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials — within 3 to 5 minutes of start of charging.

Six complete blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat — is highly effective yet gentle and safe even with explosives.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N.C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs — can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (See coupon for available bulletins on other Sturtevant machinery.) Write today.

STURTEVANT MILL CO.



Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way — circular, vertical and two lateral.

Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.



Self-cleaning, dust-sealed drum; fast, one-man accessibility

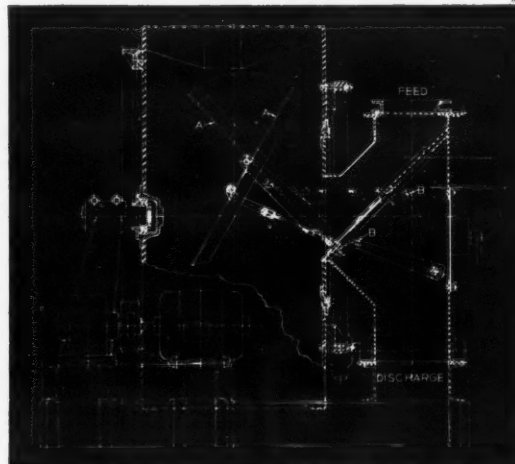
Operation of Sturtevant Blenders is self-cleaning. Drum interiors are completely dust-sealed; special design of stuffing box fully seals against leakage. For inspection of all models, one man simply loosens a few lugs to remove manhole cover — quickly and easily.

Nine standard models with capacities to 900 cu. ft.

Pilot plant blending to largest production runs are handled by standard models of Sturtevant Blenders with capacities from 10 cu. ft. to 900 cu. ft. Rotary drum design is a proven space-saver, including headroom. Write for Bulletin No. 080B giving complete specifications.

Sectional view of Sturtevant Blender

'A' (solid line) shows swinging chute in blending position; 'B' (solid line) shows gate closed for blending. 'A' (dotted line) shows swinging chute in discharging position; 'B' (dotted line) shows gate open for discharging.



When inquiring check 3429 opposite last page

My dry-process materials are:

Desired capacity is:

Name

Firm

Street

City

Title

State

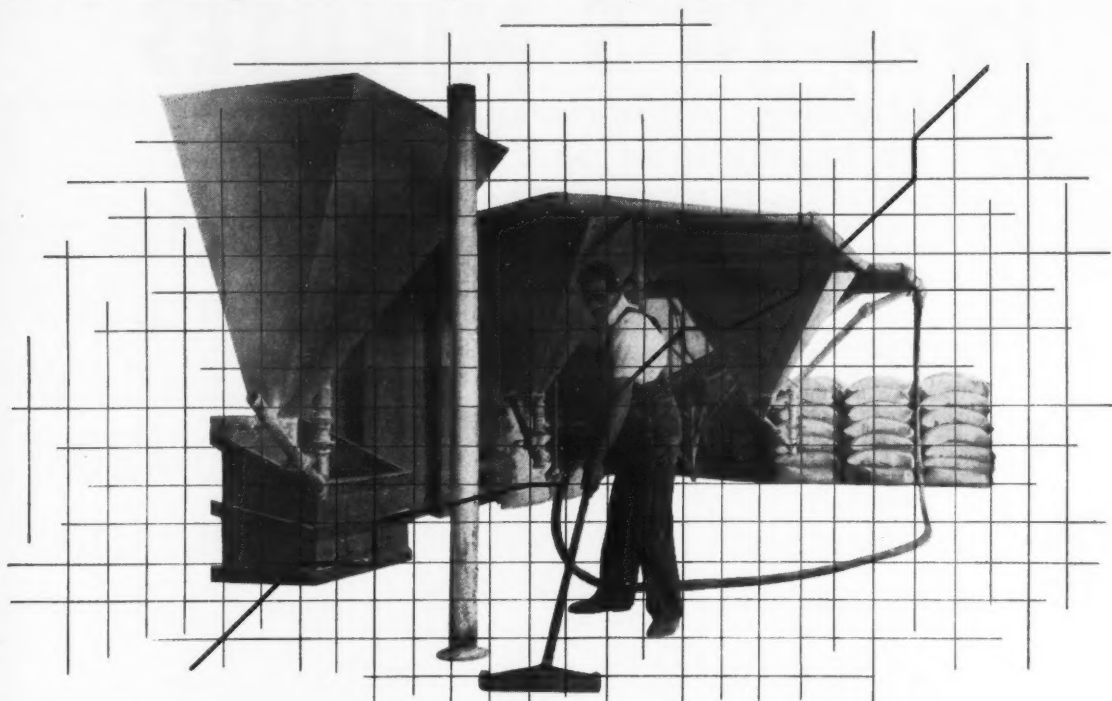
Zone

STURTEVANT MILL COMPANY, 115 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Blenders
Also bulletins on machines for:

- ☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ AIR SEPARATING ☐ MIXING
☐ SCREENING ☐ GRANULATING ☐ CONVEYING

Hoffman engineered systems get results:



this custom-designed

HOFFMAN STATIONARY VACUUM CLEANING SYSTEM

aids plant cleanliness...recovers valuable product!

The Holly Sugar Corporation has always been proud of—and noted for—its "housekeeping". In its refinery at Brawley, California, three or four men were assigned to daily hand-sweeping but the management soon realized that sweeping removed only part of the dust while the remainder was moved and rescattered through the plant.

Hoffman was asked to survey the requirements; and designed a stationary vacuum cleaning system, with the following features:

1. Adequate capacity for rapid and thorough cleaning of the entire plant with sufficient inlet valves to make the work as easy as possible.
2. Convenient location of the separators so the collected material is dumped directly into "remelt" for recovery of sugar.
3. Connections for 2" vacuum hoses at points where spills had previously

required laborious and costly handling.

4. Much of the dust in the plant was seeping from the housings of the bucket elevators and storage bins, so special vacuum connections, creating a slight negative pressure from the enclosures into the pneumatic system, prevented the material from escaping as dust. This was then recovered with the rest of the sugar picked up in vacuum cleaning.

As a result of the Hoffman installation, Holly Sugar now has a cleaner plant—with only two sweepers!

Let Hoffman offer recommendations for your needs, whether they are cleaning, conveying, recovery or all three. Your letter for detailed information or an engineer's survey will get prompt attention, without cost or obligation.



AIR APPLIANCE DIVISION **U.S. HOFFMAN MACHINERY CORPORATION** DEPT. CP, 103 FOURTH AVENUE, NEW YORK 3, N.Y.

AIR APPLIANCE DIVISION Multistage Centrifugal Blowers and Exhausters. Pneumatic Conveying Equipment. Industrial Vacuum Cleaning—Portable and Stationary Systems. Continuous Metal Strip Driers. "Smoothflow" Fittings and Tubing. **INDUSTRIAL FILTRATION DIVISION** Machine Tool Coolant Clarifiers—Flotation, Mechanical, and Magnetic. Lubricating and Insulating Oil Conditioners, Filters, and Vaporizers. Solvent Recovery Systems—Vacuum Stills and Filters. **ORDNANCE EQUIPMENT DIVISION** Special Pneumatic Conveying Systems, High Efficiency Centrifugal Separators. Stationary and Portable Vacuum Cleaning Equipment. Process Equipment. Pneumatic Systems for Radioactive Materials.

When inquiring check 3430 opposite last page

PROCESSING EQUIPMENT

Lime savings up to 30 percent with slaker

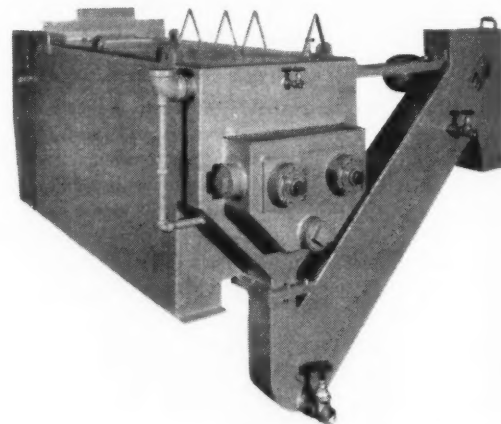
Uses all heat generated, slakes quicklime in form of paste, rather than slurry

Uses: Producing hydrated lime from quicklime.

Features: Equipment slakes quicklime in form of a paste, rather than a slurry. By slaking as a paste, more efficient slaking is accomplished since all the heat generated is used in the process. This eliminates use of insulation, heat exchangers, high speed mixers, blender valves, and hot water needed with conventional slakers, and results in a smaller, more compact unit. Savings of lime up to 30 percent are reported in actual field operation.

Description: Quicklime (calcium oxide) is fed with a controlled amount of water into one end of slaking compartment. Mixing is done by two sets of counter-rotating, intermeshing paddles, which push slaked material to discharge end. Paste is heavy enough to carry with it all the grit and stones normally encountered in raw material.

Hydrated lime paste is discharged from slaking compartment over a weir. There it is struck by a



Lime slaker operates on cold water, uses all heat generated in process

flat water spray which breaks up paste and separates from it any grit that might be present. Slurry is further agitated by series of paddles to produce a uniform suspension and to wash any lime from the grit and stones.

Grit settles to bottom and is pushed forward to discharge point where it drops directly onto a drag chain conveyor. Lime slurry flows out over a weir into a chamber in which outlet is located. Design is such that lime slurry can flow by gravity, or can

be pumped for positive feeding to point of application. Additional water can be added at this point, if desired.

Slaking tank is designed for easy cleaning. All wearing surfaces are constructed of abrasion-resistant materials. Built-in steam and dust condenser of the water-spray type removes all dust and steam generated in both the feeder and slaker during operation. These are returned to the dilution compartment so that every bit of quicklime is used.

Units are available in various sizes.

(Viscomatic lime slaker is product of Infilco, Incorporated, Dept. CP, P.O. Box 5033, Tucson, Arizona . . . or for more information check 3431 on form opposite last page.)

Information to help solve problem of selecting distillation column

Reprint of eight pages covers process selection of distillation columns. Factors from which optimum results must be determined are listed. Three general types of towers (packed, sieve tray, bubble cap) and advantages of each are discussed. Presentation is augmented by photographs and drawings of equipment and components.

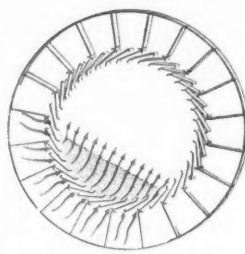
Reprint "Process Selection of Distillation Columns" is issued by The Colonial Iron Works Co., Dept. CP., 17643 St. Clair Ave., Cleveland 10, Ohio. When inquiring specify 3432 on form opposite last page.



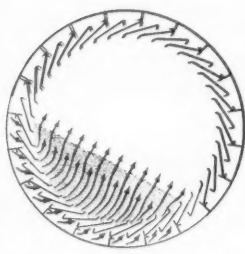
"Memo to the boss . . . Dear R.P.: They're unloading acid next to the parking lot and it's spilling all over your car . . ."

There's a big difference in rotary dryers

Link-Belt Roto-Louvre Dryers provide precise processing for heat-sensitive, friable and hygroscopic materials



Section thru feed end

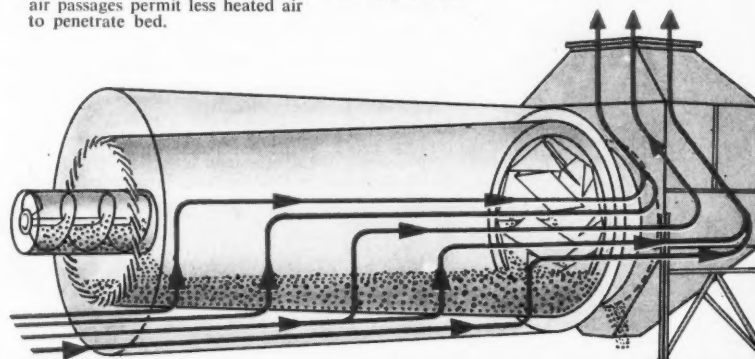


Section thru discharge end

1. NO OVERHEATING — Large volume of hot, dry air easily penetrates thin bed at feed end for maximum heat transfer where greatest evaporation can take place. At discharge end, smaller air passages permit less heated air to penetrate bed.

2. NO BREAKAGE — Material rolls gently over itself in a spiral path to the discharge end of the dryer, minimizing abrasive effects and degradation.

3. UNIFORM DRYING — Each face of every particle is reached many times by hot gases.

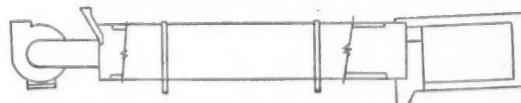


4. LOW MAINTENANCE — Mounted parallel on trunnion rollers, Roto-Louvre maintains its alignment.

5. LONG LIFE — Material rolls over itself—no abrasion of louvers. Hot gases hit metal only 25% of time.

6. COMPACT — Short retention time often saves up to 50% of floor space needed for other dryers.

Single-shell dryer for non-sensitive materials



Material is carried up by lifters, gradually discharged through air stream. High temperatures can be used for high-capacity drying of non-sensitive materials having uniform particle size. Although first cost is low, abrasive action is high as are space requirements.



For facts on the broad Link-Belt dryer line, see your nearby district office. And for data on the Roto-Louvre, write for Book 2511.

Only the Link-Belt Roto-Louvre offers all these advantages

ALTHOUGH Link-Belt builds several types of dryers, including a superior single-shell design, we recommend the Roto-Louvre wherever sensitive materials are to be processed. When there's a problem of overheating, breakage, variation of particle size or floor space—this precision dryer is the answer. We'll be glad to laboratory-test a sample of your material—a pound or a ton—work out drying, cooling or roasting procedures you can duplicate in your own plant.

LINK-BELT

DRYERS • COOLERS • ROASTERS

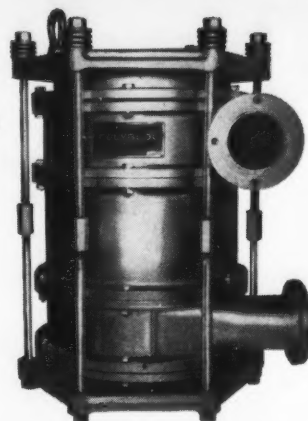
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,305

When inquiring check 3433 opposite last page

polybloc

GRAPHITE HEAT EXCHANGER

- No fragile tubes
- No danger from leakage
- Complete corrosion resistance
- No cemented joints
- Freedom from mechanical and thermal shock



Write for
14-page
Engineering
Manual

The "Polybloc" Graphite Heat Exchanger is constructed of high strength, molded graphite blocks which are impervious to acids, alkalis and solvents. These stacked blocks are held in compression by

external spring loaded tie bars to insure ruggedness, freedom from shock and leakage. In addition, this construction eliminates the need for cemented joints or fragile tubes.

Quick Delivery • Guaranteed Performance • Designed to Meet Your Specifications

THE CARBONE CORPORATION



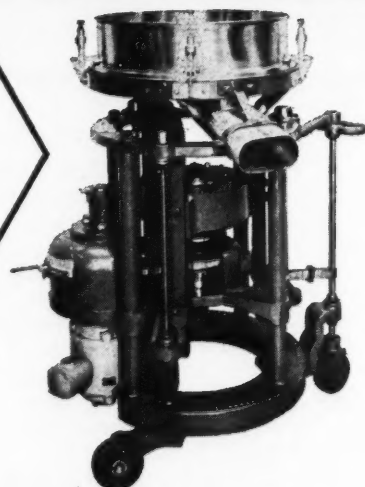
BOONTON, NEW JERSEY

When inquiring check 3434 opposite last page

FOR HIGH-SPEED, LOW-COST SIEVING of LIQUIDS • POWDERS • SLURRIES

the Vorti-Siv

Available in Several Sizes
Wide Screening Range
(up to 400 Mesh)



- Entirely New Mechanical Sieving Action
- Adjustable Amplitude / Variable Speed
- Vastly Increased Throughputs
- Faster, Easier Cleaning
- Virtually Non-Blinding Screen
- Exceptionally Quick Changing of Mesh Sizes
- Caster-Mounted for Mobility

For complete information and prices, contact
J. M. LEHMANN COMPANY, Inc., Lyndhurst, N. J.
or an authorized Vorti-Siv Agent:

The R. P. Anderson Co. 2503 W. Mockingbird Lane Dallas, Texas	Ala. Ark.	Miss. Okla. Tex.	Harry A. Baumstark & Co. 6801 Arsenal Street St. Louis, Missouri	Ill. (Southern) Mo.	The Hoshall Company 1414 Morningside Drive Atlanta, Georgia	Fla. Ga. N. C.	S. C. Tenn.	The Moore Drydock Co. Ft. of Adeline Street Oakland, California	Calif.
Wm. B. Sanford, Inc. 601 West 26th Street New York, New York	Conn. Del. D. C.	Me. Mass. N. Y.	N. H. N. J. R. I. Vt.	Webster Equipment Co. 549 W. Randolph Street Chicago, Illinois	Ill. (Northern) Wis.	G. R. Williams Sales 1619 Progress Street Lincoln Park, Michigan	Mich.	Sada y Himes S.A. Apartado 911 Padre Mier 1250 Pte. Monterrey, N.L. Mexico	Mexico

When inquiring check 3435 opposite last page

PROCESSING EQUIPMENT

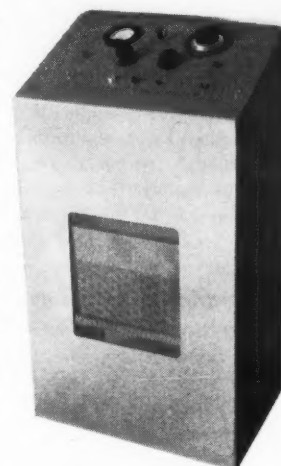
**RF power output of 500 watts,
various frequency levels,
in ultrasonic generators**

Uses: For performing numerous electro-mechanical techniques such as cleaning, chemical processing, soldering, and drilling.

Features: Units have untuned output system, 500 watt RF power output, and varied range of frequency levels.

Description: Series of generators, designated Glennite U-405, are blower cooled and operate at nominal fixed frequency of 40 kc or at any frequency between 20 kc and 2 mc, depending on model.

(Glennite U-405 series of ultrasonic generators are product of Gulton Industries, Inc., Dept. CP, 212 Durham Ave., Metuchen, N.J. . . or for more information check 3436 on form opposite last page.)



Ultrasonic generators are designed to drive a wide variety of low-impedance ultrasonic transducers

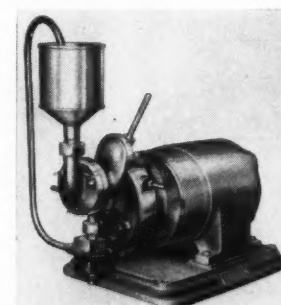
Colloid mill is easy to clean and operate . . .

rotary shaft seal may be removed from mill body and disassembled by hand

Uses: Emulsification and dispersions of chemicals, waxes, and paints.

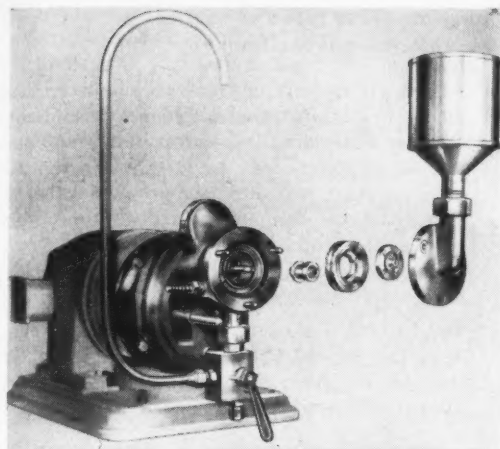
Features: Design incorporates removable rotor, stator and rotary shaft seal. This simplifies operation, speeds changeover and cleaning, and eliminates shaft leakage.

Description: Mill body is water-jacketed for either heating or cooling. Micrometer adjustment (0.001-0.040) may be changed at any time in a matter of minutes. Solid stainless steel body of sanitary design eliminates all pockets or



Simplified field calibration on mill, can be made in just a few minutes

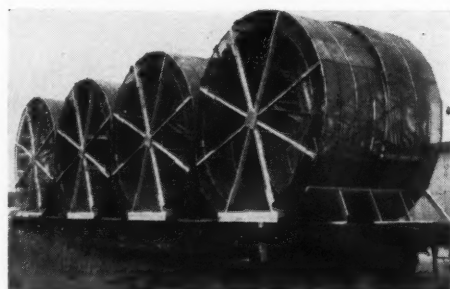
PROCESSING EQUIPMENT



Mill can be easily disassembled for quick cleaning, maintenance, and replacement of parts

crevices for easy cleaning. Rotor peripheral speed on all models is 10,000 fpm. Rotor and stator are available in tungsten carbide, ceramic, alundum, and other special materials. Flow of product is isolated from drive end of mill by rotary shaft seal. Mills are available in capacities ranging up to 2600 gph.

(RE colloid mill is manufactured by Manton-Gaulin Mfg. Co., Inc., Dept. CP, 44 Garden St., Everett 49, Mass. . . . or for more information check 3437 on form opposite last page.)

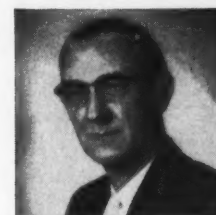


Giant filter media retaining screen . . .

. . . occupies an entire flatcar for shipment to sulfuric acid producer. Unit, produced in four sections to facilitate handling, consists of two cylindrical screens, one fitting into the other. Outer cylinder is 20 ft high and 13 ft in diameter. Inner unit is 20 ft high with 10 ft diameter. Unit was produced from 3 x 3" mesh of 0.135" stainless steel wire cloth of double crimp weave.

(Filter media retaining screen is product of The Cambridge Wire Cloth Co., Dept. CP, Cambridge, Md. . . . or for more information check 3438 on form opposite last page.)

a series about PROCTOR SERVICES for your new products



Mr. Albert G. Blank
Sales Manager
Process Industries Sales

No. 2: the effective approach to your drying problems

Planning the most effective approach to *your* drying problem is important to *you*.

There is first, the need of a well integrated research program such as we discussed in the first of this series of PROCTOR services last month.

Secondly, there is the need for a full understanding of the drying problem. Such understanding requires knowledge of a number of items; such as, the properties of the material to be processed, preliminary wet processing and preforming techniques and how they affect drying rates together with a familiarity with the advantages, as well as the limitations of all types of drying equipment. PROCTOR'S service provides the required understanding of your drying problem through the background of experience of PROCTOR Engineers.

Make use of this PROCTOR service! It will help you assemble all the essential data for the most logical solution to *your* drying problem.

Your material characteristics, capacity desired, initial and final moisture conditions, permissible operating temperatures, corrosive conditions, and many other similar items enter into the considerations which must be given *your* problem. The analysis of such information will lead to the ultimate production of a quality product through the use of quality equipment.

Through the cooperation of your PROCTOR Engineer, such an analysis permits this pertinent information to be successfully translated into the preliminary selection of a drying system.

And there is more to PROCTOR'S service. Before this preliminary choice can be made final, the exact conditions under which the material will be processed must be established by a controlled test program. These tests provide the basis for accurately sizing the commercial installation; they are the foundation of PROCTOR'S guaranteed performance.

The importance of this test program, and details of this part of PROCTOR service will be more fully covered next month.

Why not call us at PROCTOR? We welcome the opportunity of serving you as we have so many others, in order to achieve the successful and economical solution of a drying problem.



PROCTOR & SCHWARTZ, INC.

PHILADELPHIA 20, PA

When inquiring check 3439 opposite last page

SHARPLES • Headquarters for PARTICLE CLASSIFICATION

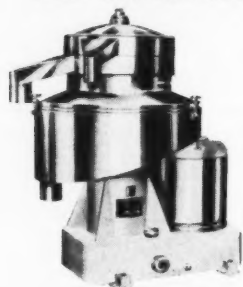
WET PROCESSING

The SHARPLES SUPER-D-CANTER



Continuously handles particles in slurries from a few microns in size up to 1/4" diameter, with solids contents ranging from 1% up to thick sludges—clays, ores, plastics, chemicals.

The SHARPLES DH-3 NOZJECTOR



The heavy-duty, continuous concentrator-classifier with high efficiency on even the tough jobs. Built-in recycle feature. Rugged drive delivers full 50 HP to the bowl. The DH-3 classifies extremely fine particles at high capacity.

The SHARPLES SUPER CLASSIFIER



A revolutionary innovation in dry powder classification in the particle size range of approx. 10 to 125 microns—the Super Classifier combines sharpness of separation with high capacity and high product recovery.

The SHARPLES

Micromerograph



Particle size distribution analysis can be made of fine dry particles in 15 minutes to 2 hours with accuracy within 3%. The Sharples Micromerograph is fast becoming the standard instrument of industry.

Take advantage of Sharples' leadership in particle classification—send us your problems for evaluation and recommendation.



THE SHARPLES CORPORATION
2200 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • SAN FRANCISCO
SEATTLE • LOS ANGELES • SAN PEDRO • HOUSTON • ST. LOUIS

When inquiring check 3440 opposite last page

PROCESSING EQUIPMENT

Diagrams four types of control for chlorine gas feeder

Construction features, operation and application, safety features, and dimensions and control variations are discussed in four-page bulletin on chlorine gas feeder. Semi-automatic, step, program, and automatic proportional types of control are diagrammed. Illustrations show visible flow indicator, visible vacuum, Pyrex-brand glass bell jar, and positive-control chlorine diaphragm valve.

Bul 840-N-10 is issued by Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, Rhode Island. When inquiring specify 3441 on form opposite last page.

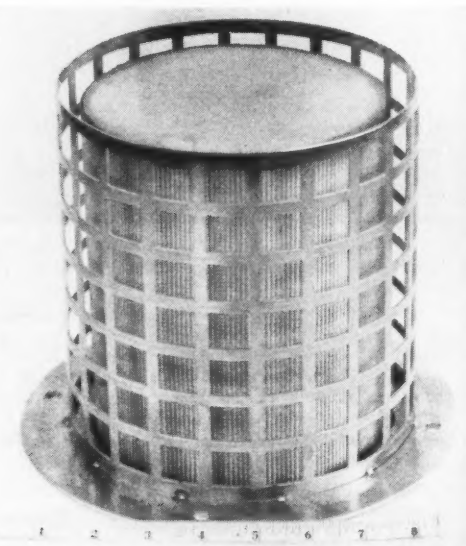
Rigid wire mesh filter operates at -65° to 900° F...

wires of mesh furnace-welded at all contact points to give plate-like characteristics

Uses: Filtering gaseous and liquid nitrogen, oxygen, helium, and similar materials.

Features: Filter operates at temperatures from -65° to 900° F, and pressures from vacuum to 10,000 psi service. Particle size retention ratings are 2 to 2000 microns.

Description: Element, made by furnace-welding the wires of the mesh at all contact points, has plate-like characteristics that permit fabrication by cutting, rolling, corrugating, and welding without loss of original uniformity of mesh openings.



Filter element has particle size retention ratings of 2 to 2000 microns

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

Two or more layers can be homogeneously bonded together to form a laminate. This type, having thin, fine facing bonded to coarse backing mesh, combines fine filtration qualities with high mechanical strength. Filter elements are lightweight, corrosion- and temperature-resistant, and reusable.

("Rigimesh" filters are product of Aircraft Porous Media, Inc., Pall Filtration Companies, Dept. CP, 30 Sea Cliff Ave., Glen Cove, N. Y. . . . or for more information check 3442 on form opposite last page.)

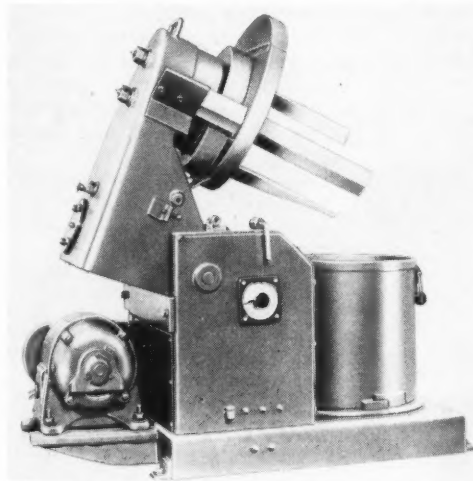
Mixer withstands strains of heavy mixes . . .

rugged 8-gal unit has double paddle arrangement

Uses: Suitable for small batch work in mixing paints, chemicals, inks, etc.

Features: Mixer is sturdily built and has strength to withstand strains of heavy mixes.

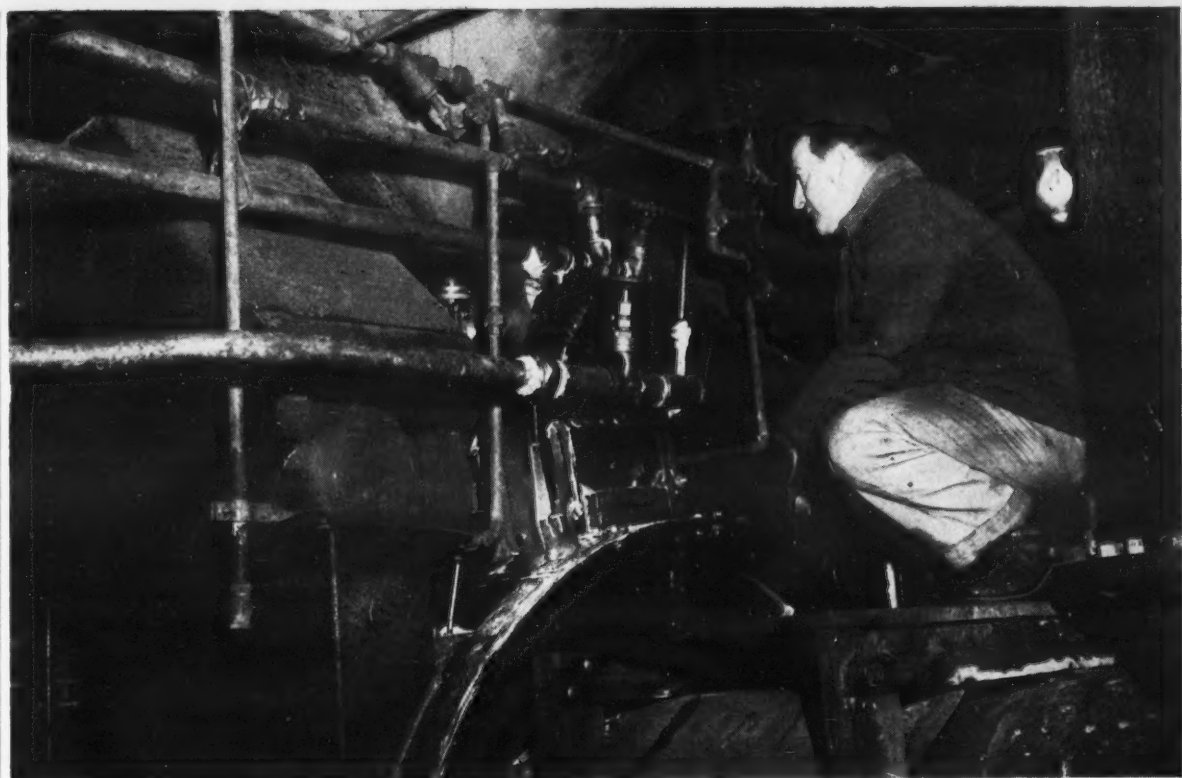
Description: Double paddle mixer has 8-gal capacity. Blades and can table are powered in close-coupled drive arrangement by 2-hp motor. Hand tilting device to lift paddles is balanced and pivoted for raising and lowering ease. Can cover, which is integral with head and lifts out of



Can of double paddle mixer can be easily filled or quickly replaced

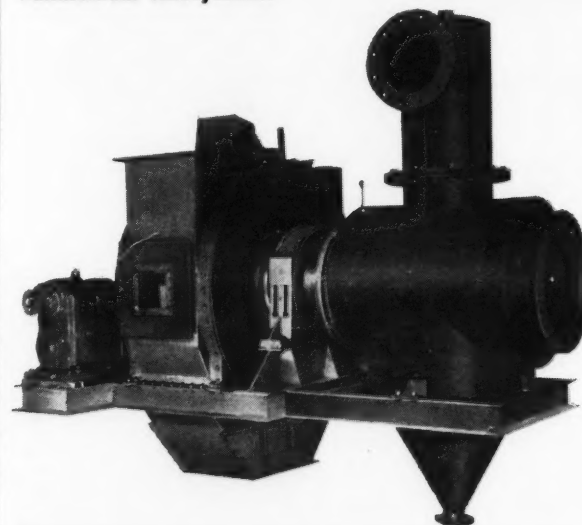
way when head is raised, has hinged door for adding ingredients. All drives and gearing are enclosed. Locking device holds head down securely when in mixing position.

(Double paddle mixer is product of The Cincinnati Hildebrand Co., Dept. CP, 3410-J Beekman St., Cincinnati 23, Ohio . . . or for more information check 3443 on form opposite last page.)



EIMCO DRYER HANDLES ABRASIVE CRYSTALLINE SLURRY

Decision of a large American producer of gas, fuel and chemical by-products to install an Eimco Top Feed Continuous Vacuum Dryer, was the result of their need for equipment to dewater and dry Ammonium Thiocyanate.



The extraction of this chemical from coal is unique to this company.

The processes used produce NH_4CNS in crystal form and the crystals are precipitated prior to drying. The extremely corrosive slurry is fed to the Eimco through a 20×20 mesh screen, .019 inches open.

Stainless steel materials of construction have resisted the highly abrasive physical characteristics in the feed to provide trouble-free, low maintenance service since 1941.

The $4' \times 2'$ Eimco Dryer has 25 square feet of producing area. It processes 4,000 lbs. of concentrate per day (160 lbs. per square foot of filter area per day). Further economies are realized through the nominal BTU requirements necessary to dry a pound of NH_4CNS .

Eimco Top Feed Dryers have been particularly successful in plants dewatering slurries with fast settling solids of a granular or crystalline nature . . . and in processing heavy metallurgical feed where filtering rate justifies continuous operation.

Eimco's Research and Development Center at Palatine, Illinois, provides you with the most competent in manpower and facilities to help you choose the proper unit for your filtration problem . . . Let them go to work for you — today!

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois

Export Office: Eimco Building, 51-53 South Street, New York 5, N. Y.

Process Engineers Inc., Division, San Mateo, California

BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



B-244

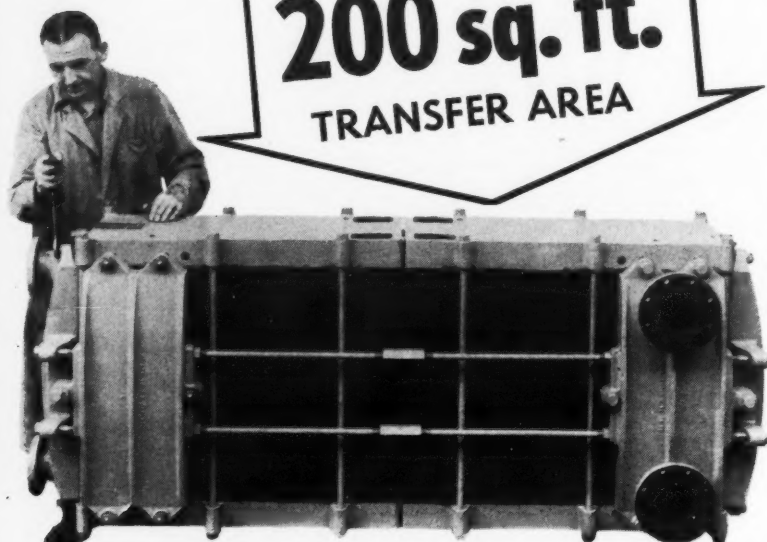
When inquiring check 3444 opposite last page

'Delanium'® Graphite

BLOCK TYPE

HEAT EXCHANGERS

up to
200 sq. ft.
TRANSFER AREA



SINGLE-UNIT EFFICIENCY . . . no hook up of smaller units in series

Now, a 'Delanium' EXCLUSIVE — Graphite Block Type Heat Exchangers to meet the needs of the chemical process industries for a unit of high capacity.

'Delanium' extends its range of graphite heat exchangers up to 200 sq. ft. — while retaining all the advantages of smaller models:

- Rugged, simple, compact — no "floating head," no packing, no gaskets between fluids.
- High density impervious 'Delanium' processed graphite provides corrosion resistance to most acids, alkalis and solvents.
- High over-all heat transfer in heating, cooling, evaporating, or condensing applications.
- Controlled velocities over a wide range of flow rates.
- Graphite is of one piece construction, and higher working pressures and temperatures can be utilized.
- Easy access for cleaning and maintenance.

Descriptive literature and technical assistance on request.

'Delanium' is the registered trade mark of Powell Duffryn Carbon Products, Ltd., Hayes, England.

DELANIUM GRAPHITE COMPANY

134 Elmora Ave., Elizabeth, N. J.

When inquiring check 3445 opposite last page

PROCESSING EQUIPMENT

Vertical pressure-type water filters described in bulletins

Two four-page publications describe two kinds of vertical pressure-type water filters. Difference between units is primarily in underdrain systems. Underdrain on one has slotted convex or domed diffuser plate welded to bottom head. Underdrain on other consists of header lateral system with brass strainers. Operating details, filter bed materials, and available accessories are cited.

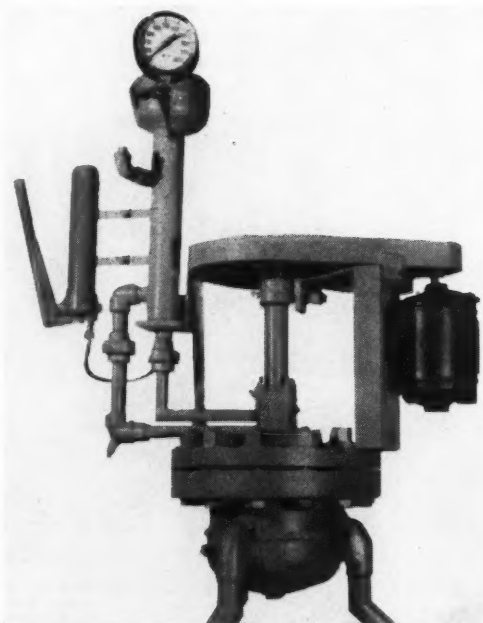
Vertical pressure-type water filter bulletins are issued by Cochrane Corporation, Dept. CP, 17th St., below Allegheny Ave., Philadelphia 32, Pa. When inquiring specify 3446 on the convenient Reader Service slip which is located opposite last page.

Reactions to 750 psi handled safely in glassed-steel autoclave

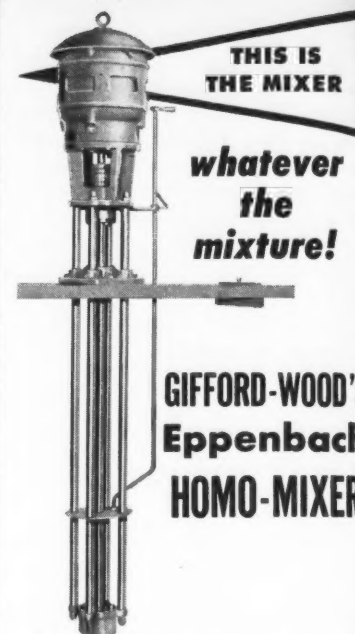
Uses: Unit is designed to handle reactions up to 750 psi.

Features: Constructed of glassed carbon steel, equipment is corrosion resistant and has structural strength necessary to withstand relatively high pressures.

Description: Glassed-steel construction minimizes possibility of undesired catalysis in product. Reaction of corrosive liquids can be studied without fear of harming unit. Variable-speed drive



Glassed-steel reactor can handle wide variety of corrosive materials



THIS IS
THE MIXER

whatever
the
mixture!

GIFFORD-WOOD'S
Eppenbach
HOMO-MIXER

A high speed, high shear homogenizer-mixer for complete, "no-vortex" mixing of chemicals, cosmetics and pharmaceuticals to produce emulsions of small particle size and long shelf life.

Check these features:

- Continuously draws material from the bottom of the tank, thus eliminating a vortex and minimizing air intake.
- Easily adjustable deflector plate to control flow pattern.
- Stationary or portable operation.
- Homogenizing head dismantles easily for cleaning.
- All immersed parts of stainless steel.
- Can be modified to suit existing processing requirements.
- Capacity governed by viscosity, specific gravity and batch size.
- Laboratory and production sizes.

FREE Eppenbach Catalog No. 402R-2 describing HOMO-MIXER Models and accessories. Write for it. Also ask about the famous Eppenbach Colloid Mills and Agi Mixers and G-W Chemical Feeders and Breakers.

GIFFORD-WOOD Co.

Since 1814

GIFFORD-WOOD CO.
Eppenbach Division, Dept. CP5
420 Lexington Avenue, New York 17, N. Y.
Send me Catalog 402R-2 describing HOMO-MIXERS.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ 3636

When inquiring check 3447
opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

and glassed-steel two-blade impeller mixers permit range of agitation. Provision is made for thermometer well. Non-metallic rotary seal is equipped for pneumatic lubrication. Units are available with capacities ranging from one to three gallons.

(Autoclave is product of The Pfaudler Co., Dept. CP, 1023 West Ave., Rochester, N.Y. . . . or for more information check 3448 opposite last page.)

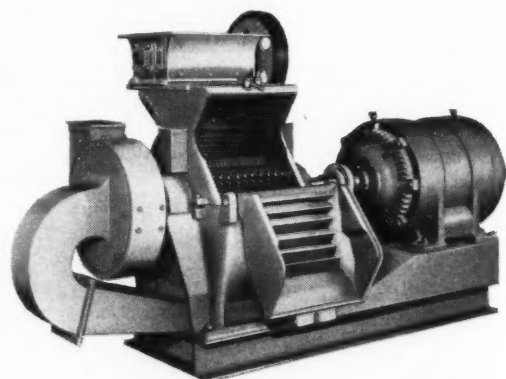
Four-point reversible hammers featured on mill . . .

permit unit to operate at greater output with less downtime and only minimum maintenance

Uses: Grinding grains and similar free-flowing materials in chemical and allied fields.

Features: Heavy-duty mill is designed for continuous high-production service. Balanced 4-point reversible hammers are made of special hardened alloy steel permitting unit to operate at greater output with minimum downtime and maintenance.

Description: Hammer mill's heavy cast-iron construction and machined base and bearing pedestals assure correct alignment of rotor and result in smooth, vibration-free operation. Mill weighs 5290 lb equipped with 75 hp motor. Dimensions are 8'5" long, 3'4" wide, and 3'10 1/2" high.



Heavy-duty hammer mill provides smooth, vibration-free service

Uniform feeding is controlled by crusher-feeder mounted on mill's feed chute. Permanent-type magnet is mounted in inlet spout to remove tramp iron and other foreign metal objects. Hinged door on side of mill permits easy access for screen removal or hammer adjustments. Rotor is 18" wide and operates at 3500 rpm.

(HD Hammer Mill is product of Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. . . . or for more information check 3449 on form opp. last page.)



Thousands of pressure vessels like these have been produced for the A. E. C. by Newport News, ahead of contract delivery schedule. Nickel-plated inside and out, they withstand corrosive uranium-hexafluoride gas.

When the pressure's on for pressure vessels

Specialized production techniques and the skill of Newport News craftsmen operating vast fabricating shops team up to deliver trainloads of pressure vessels on schedule.

When it comes to turning out process equipment, Newport News has the facilities and experience. So get a bid from Newport News on your present or future projects. Get the benefit of plant methods developed by specialists producing pressure vessels, vacuum tanks, towers, reactors, weldments and sub-assemblies.

Look over the scores of ways in which Newport News can help you . . . send for the easy-to-read, illustrated booklet *Facilities and Products*. It's yours for the asking.

Engineers: Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

Newport News

Shipbuilding and
Dry Dock Company
Newport News, Virginia

When inquiring check 3450 opposite last page

Let the Morehouse-Cowles Equipment and Service Plan help you:

- Multiply dispersing and grinding volume
- Improve product quality
- Save valuable space
- Cut operating costs

The use of this service, we believe, practically guarantees greater plant efficiency with resulting increased profits for all manufacturers whose processes require particle size reduction, dissolving, dispersing, mixing, emulsification, deaerating, homogenizing or related operations involving corrosive and/or non-corrosive liquid-liquid, gas-liquid, or solid-liquid formulas.

Attrition-type Morehouse Mills normally produce *up to four times as much* as ordinary equipment—even more, depending upon materials involved and end product desired. Cowles Dissolvers with specially designed patented impellers, drives and vessels show comparable performance in their phase of operations.

In many cases the two units may be teamed together to produce literally amazing results. Hundreds of operational reports in our files show production multiplied many times as compared to previous methods, with the additional great advantage of extremely accurate control of particle size and consistency in the finished product.

Let us prove it in your plant—at our risk!

You are invited to use any or all of the facilities of this plan. We will be glad to demonstrate its possibilities in your own plant, on your materials. Write us about your problem today. There is no obligation.



Morehouse-Cowles, Inc.
1150 San Fernando Road, Los Angeles 65, Calif.



5703

When inquiring check 3451 opposite last page

• Advanced methods of attrition grinding and impeller dispersion have brought surprising improvements in production volume, product quality, cost reduction and space saving. In many fields, adequate information and assistance for engineers and others concerned with designing new plants or modernizing old ones have not always been readily available. As a result of broad practical experience and exhaustive scientific study, Morehouse-Cowles, Inc. is now pleased to announce a complete nationwide service, proved in practice, that offers manufacturers many important advantages. This plan consists of

1. Survey and consultation on your requirements, without obligation, by a member of our technical staff.
2. Study of end product results desired and materials involved.
3. Competent laboratory assistance, if desired.
4. Equipment application recommendations and engineering for any necessary adaptations.
5. In-plant test to prove results and advantages.
6. A comprehensive report of findings for your consideration.
7. Follow-up service as required, to assure maximum results at minimum cost.

PROCESSING EQUIPMENT

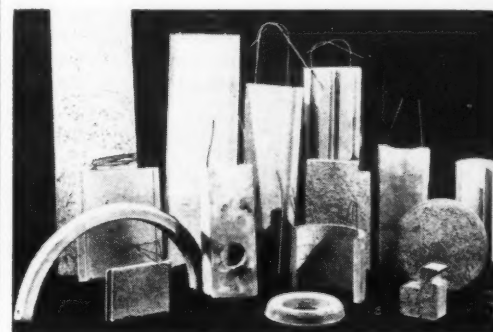
Temperatures up to 2000°F withstood by electric heating elements . . .

ceramic-embedded units resist attack by gases

Uses: Originally developed for use in electric furnaces, elements are finding application in chemical and nuclear plants and laboratories for heating pipe, tube, and vessels.

Features: Ceramic-embedded electric heating elements withstand temperatures up to 2000°F. Units are available in diverse shapes and sizes, ranging from flat rectangular blocks to semi-cylindrical shapes. Ceramic covering protects heating coils against damage from gases and spatter.

Description: Heating elements consist of molded ceramics in which are embedded electric resistance coils pre-annealed and shaped to fit desired form. Embedding ceramic is formed by ramming in



Ceramic-embedded heating elements are available in practically any desired shape and size

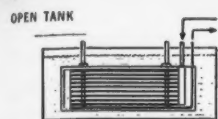
molds. It is then stabilized and hardened by heat treatment. The ceramic has good dielectric strength and thermal conductivity. Elements are provided with terminals of enlarged cross-sectional area to prevent overheating where terminals extend through insulating walls.

(Ceramic-embedded heating elements are product of Cooley Electric Manufacturing Corporation, Dept. CP, 38 South Shelby Street, Indianapolis 7, Indiana. Check 3452 opposite last page.)

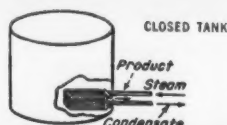
Tells about heavy-duty hammer mill featuring instant-change screen

Specifications on heavy-duty hammer mill in 75-100 hp range are listed in one-page bulletin. Instant-change screen, which can be inserted or removed safely while mill is running, is feature of unit.

Bul on Model 68 Hammer Mill is issued by Schutte Pulverizer Co., Inc., Dept. CP, 878 Bailey Ave., Buffalo 6, N.Y. When inquiring specify 3453 on form opposite last page.



OPEN TANK

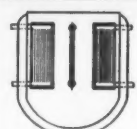


CLOSED TANK

IN ANY CORNER OF YOUR PLANT



AGITATED TANK



JACKETED TANK

IN ANY TYPE OF TANK PLATECOIL® CUTS HEAT TRANSFER COSTS

Use Platecoil heat transfer units singly, in series or in banks. Install them on end, flat or on their sides. Compact, light in weight and high in efficiency, they fit in any type of tank, do a better job and save money compared to old-fashioned pipe coils.

Fast delivery from stock



Write today for your copy of Bulletin P-54.



You'll find our catalog in Sweet's Plant Engineering file

When inquiring check 3454 opposite last page

WHEN SPECS CALL FOR...

PROCESS TANKS

for the
Chemical Processing
Industry
on the
West Coast



Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.



Request
Brochure No. M-57



**PUGET SOUND
FABRICATORS, INC.**

Craftsmen in Metals

3670 E. Marginal Way • Seattle 4, Wash.

Craftsmen in steel plate and alloys up to 1"

When inquiring check 3455 opposite last page

MAY 1957

PROCESSING

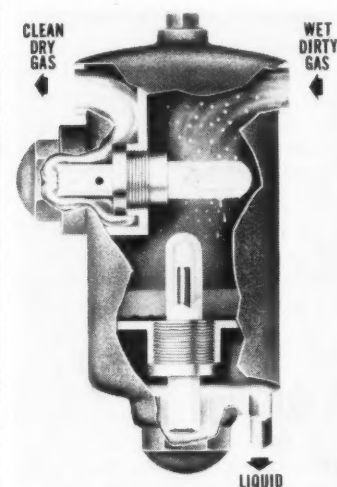
Absence of moving parts cuts maintenance costs of separator...

removes suspended liquids,
solids from process gas lines

Uses: For removing entrained liquids and solids from air, gas and steam systems.

Features: Maintenance costs are cut to minimum because there are no moving parts. Unit is easily accessible for cleaning and replacement, and can be installed flush against wall or in-line with any normal piping.

Description: Liquid-gas separation device operates by phase separation. It traps solids, and passes liquid in one direction and gas in

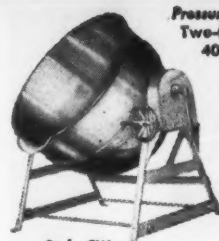


No extra pipes or special fittings
needed for liquid-gas separator

another, without interrupting flow through line. In addition to air and steam, gases such as hydrogen, oxygen, nitrogen, argon, propane, and butane, are presently being cleaned and dried.

Units are available for volumes up to 100 scfm at 150 psig, 7000 scfm at 200 psig, and for conditions where unusually large volumes of condensate are encountered.

(Liqui-Jector is product of Selas Corp. of America, Dept. CP, Dresher, Pa. . . or for more information about manufacturer's product reader may simply check 3456 on form which is located opposite last page.)

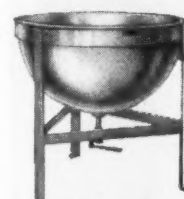


Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

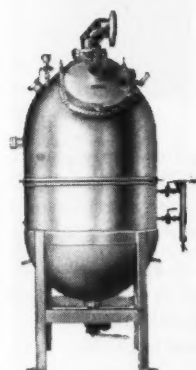
Style CW
Kettle
Two-thirds Jacketed
80 to 300 gal.



Style A Kettle
Two-thirds Jacketed
5 to 500 gal.



Style B Kettle
Full Jacketed
10 to 300 gal.



Vacuum Pan
50 to 500 gal.



Quick Cooling Pan
50 to 200 gal.

REDUCE YOUR PROCESSING COSTS WITH

CORROSION-RESISTANT

Built from time-proved
stainless steel

WIDE RANGE OF SIZES

To fit your exact require-
ments

INDIVIDUALLY DESIGNED

To meet your specific
processing operation

PRECISION-BUILT

To give you long years of
peak performance

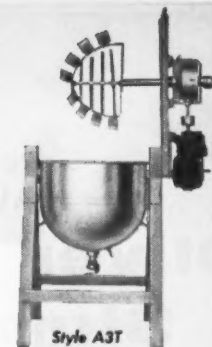
LOW MAINTENANCE

Easy to clean and keep
clean

Our technical bulletins describe
this equipment in detail.

Write for
them today!

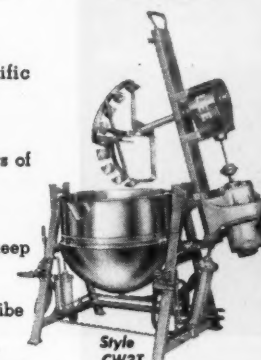
418 Pine Street, Philipsburg, Pa.



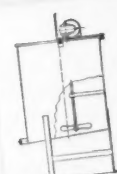
Style A37
Center-line
Scraper
Agitator Kettle
25 to 300 gal.



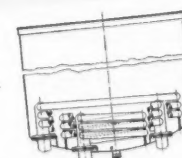
Style C Kettle
Two-thirds Jacketed
5 to 100 gal.



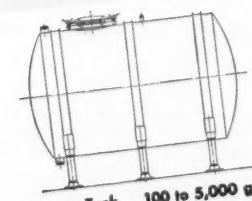
Style
CW37
Center-line Scraper
Agitator Kettle
80 to 300 gal.



Mixing Tank
25 to 500 gal.

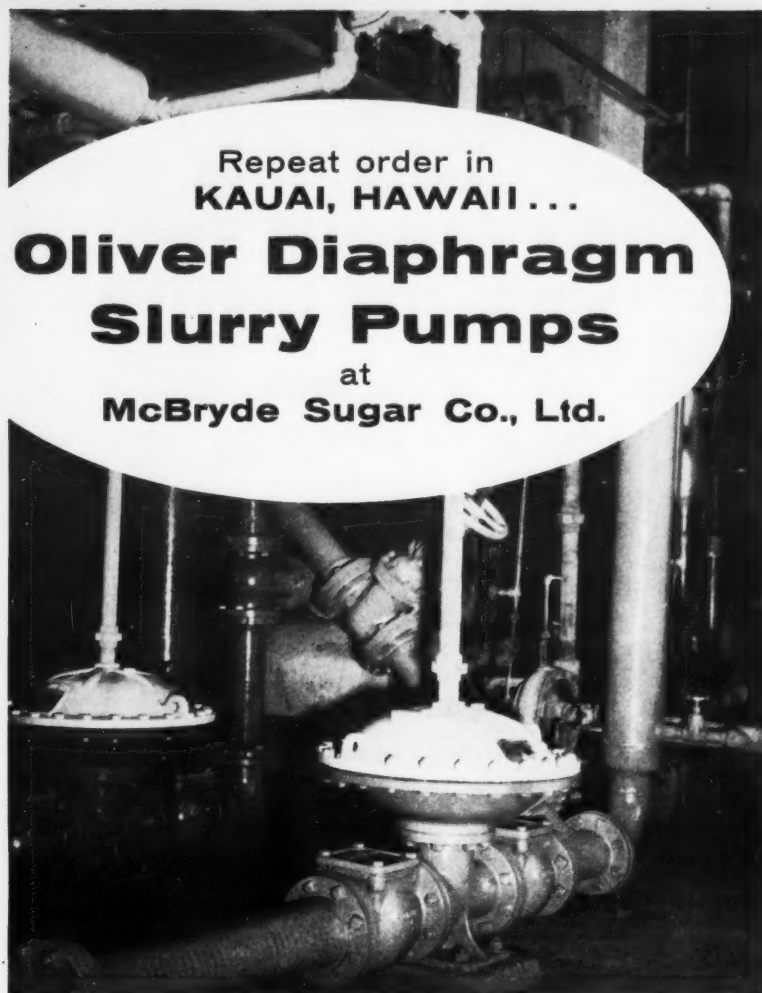


Pulp Tank 500 to 2,000 gal.



Storage Tank 100 to 5,000 gal.

When inquiring check 3457 opposite last page



Repeat order in
KAUAI, HAWAII...

Oliver Diaphragm Slurry Pumps

at
McBryde Sugar Co., Ltd.

Providing excellent transfer service lifting settlings and overflow to a filter feed mixer, this duplex installation was installed after McBryde Sugar Co. had a #3 O.D.S. Pump in line for several years.

Repeat orders are characteristic of the O.D.S. Pump story — tangible testimony to the economy and service values in the *exclusive combination* of "no mechanical linkage to the diaphragm" and "no slots or holes in the diaphragm." The difference is in the way the diaphragm gets its impulse, pneumatically — not mechanically. In addition the O.D.S. requires less space and in many installations motor maintenance costs are lower than any other pump capable of similar capacities.

Long life with low maintenance are characteristic of Dorr-Oliver Pumps. Investigate now why numerous companies are standardizing on the O.D.S. Pump. In writing for your free copy of Bulletin No. 5003, tell us about your pumping problem.



When inquiring check 3458 opposite last page

PROCESSING

Pure, oxygen-free nitrogen from compact generator

Uses: Producing oxygen-free nitrogen from ammonia.

Features: Units produce oxygen-free nitrogen with any controlled hydrogen content between 0.25 and 25 percent. Generators are compact, safe, and fully automatic. The only connections required are 110v outlet, a drain, and single lines for water, air, and ammonia.

Description: Generators produce nitrogen by reacting ammonia with air in the presence of a platinum catalyst. Unit produces a gas completely free of oxygen. Generators range in capacity from 50 to 10,000 scfh. Maintenance costs are practically nil. Catalyst lasts indefinitely.

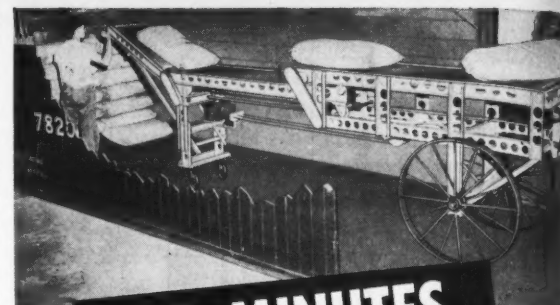
Costs when producing nitrogen with minimum hydrogen content of 0.25 percent are \$2.40 per 1000 cu ft (using NH₃ in 100-150 lb cylinders at \$0.18 per lb). When producing a reducing atmosphere, consisting of 25 percent hydrogen and 75 percent nitrogen, costs are \$2.93 per 1000 cu ft. If ammonia is purchased in tank car lots (about \$0.04 per lb), the above mixtures can be produced at \$0.53 and \$0.65 per 1000 cu ft respectively.

(Model GNLX Nitroreal generator is product of Instruments Division, Baker & Company, Inc., Dept. CP, 207 Grant Avenue, East Newark, New Jersey. . . . or for more information check 3459 opposite last page.)

High heat transfer provided by finned-surface coils

Company's line of standard and non-freeze steam coils, using finned surface for high heat transfer, are discussed in four-page bulletin. Methods of calculating proper sizes of steam coils are shown.

Bul S-200 is issued by Halstead & Mitchell, Dept. CP, 704 Bessemer Bldg., Pittsburgh 22, Pa. When inquiring specify 3460 opposite last page.



59 MINUTES

... time enough to load a box car!

Our new improved sack loader enables you to load box cars in record time . . . 59 minutes by actual count! Now, with one man doing the work of six both time and money are saved through the elimination of trucking, carrying and lifting. Let us know your needs and one of our representatives will be glad to call. New brochure available on request.

Loaders are of aluminum construction for strength and light weight. Here 100 lb. sacks of feed are turned by conveyor belt as they come on to loader from delivery chute.

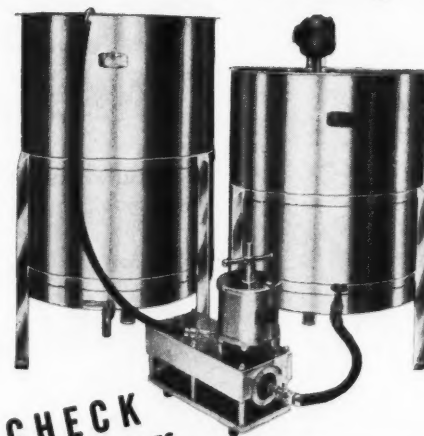
Ottumwa

BOX CAR LOADER COMPANY

C-100 OTTUMWA, IOWA

When inquiring check 3461 opposite last page

When Your Process Demands a Filter, Mixer or Mixing Tank



CHECK THE ADVANTAGES

Clip and Mail
This Coupon

For Complete
FREE

Also Catalog

ALSO ENGINEERING CORPORATION
1006 West Road, Milldale, Conn.

GENTLEMEN:

Please send me FREE, your new catalog,
"Liquid Processing Equipment"

Name

Company

Address

When inquiring check 3462 opposite last page

CHEMICAL PROCESSING

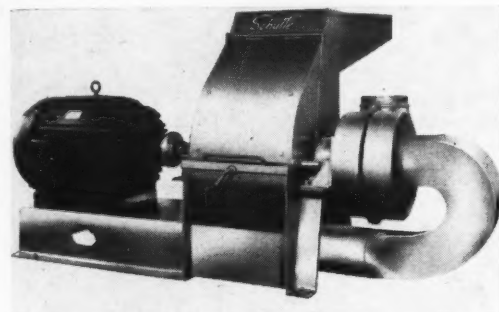
PROCESSING EQUIPMENT

Screen can be removed safely while mill is running . . .

design is such that there is no exposure to whirling hammers

Uses: Crushing brittle and fibrous materials.

Features: Instant-change screen can be inserted or removed safely while mill is running. Hand guards are not required because mill is designed so there is no exposure to whirling hammers.



Wide feed opening on mill permits easy handling of bulky materials

Description: Hammer mill has 20" feed opening and horsepower range of 75-100 at 3600 rpm. Wide feed opening and extra-high throat facilitates handling of bulky materials. Machine can be furnished with direct or belt drive. Adjustable hammer is included as standard equipment. Ten working surfaces, more than 2½ times surface of conventional hammers, provide long wearing life and low hammer cost.

(Model 168 hammer mill is manufactured by Schutte Pulverizer Co., Inc., Dept. CP, 878 Bailey Ave., Buffalo 6, N.Y. . . . or for more information check 3463 on form opposite last page.)

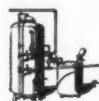
Applications of hydraulic centrifuge in chemical processing

Booklet of 20 pages explains operation of hydraulic centrifuge, and shows how it can be used as an efficient and low-cost processing tool. Typical chemical processing applications such as in treatment of industrial wastes, recovery of valuable material, and classification of materials are pointed out. A description of the operation and construction of the equipment, augmented by cutaway drawings, is included. Illustrations show typical installation of each size available.

"The Heyl & Patterson Cyclone" is issued by Heyl and Patterson, Inc., Dept. CP, 55 Fort Pitt Blvd., Pittsburgh 22, Pa. When inquiring specify 3464 on form opposite last page.



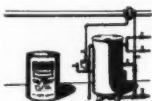
ZEOLITE WATER SOFTENER — manual and automatic. Up to 44% more soft water output from a softener of given size.



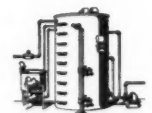
ULTRA-DEIONIZERS — produce highest quality mineral-free water. Replace distillation methods at fraction of distillation cost.



DEALKALIZATION & ION EXCHANGE SYSTEMS—Dealkalizers to control alkalinity. Ion Exchangers to produce water of any desired quality.



CHEMICAL TREATMENT SYSTEMS—prevent scale, corrosion and depositions with Elgin specially formulated chemicals.



CLARIFIER—for removing excess alkalinity and solids for clarification of turbid waters.



DEGASITORS—for removal of entrained gases from water by aeration.

They have placed their trust in **ELGIN!**

The listing below reads like a roster of the Great Names of American Industry . . . but actually it is simply a partial list of Elgin users!

These are firms and institutions you know well . . . firms that have won the respect of the entire business world for the thoroughness and discrimination with which they choose equipment and services.

All of them have relied upon Elgin products and skill to meet their water conditioning needs . . . often critical and demanding requirements that posed complicated engineering problems. The records plainly show that this confidence in Elgin has been fully justified.

Whatever your water conditioning needs, it will pay you — in immediate results; in long range savings — to place *your* trust in Elgin.

Abbott Laboratories
Aluminum Company of America
American Steel & Wire Co.
American Tobacco Co.
Arkansas Power & Light Co.
Armour & Co.
Bethlehem Steel Co.
Borden Company
California Packing Corp.
Campbell Soup Co.
Carnation Co.
Chemstrand Corp.
City of Denton, Texas
Commercial Solvents Corp.
Dr. Pepper Co.
Drewry's, Limited
Ford Motor Co.
General Electric Co.
General Mills
Howard Johnson Restaurants
Illinois State Hospitals
Iowa Power & Light Co.
Kraft Foods Co.

Kroger Grocery & Baking Co.
Liquid Carbonic Corp.
McDonald Aircraft Corp.
Monsanto Chemical Co.
Morrison Cafeterias
National Dairies
Neisner Brothers Inc.
Phillips Petroleum Co.
Quaker Oats Co.
Sinclair Refining Co.
Sisters of St. Francis Hospitals
Sky Chefs, Inc.
Southwestern Public Service Co.
Stauffer Chemical Co.
Stokely Foods, Inc.
Swift & Co.
Texas Christian University
U. S. Atomic Energy Comm.
U. S. Government (Army, Navy, Air Corps)
University of Iowa
Westinghouse Electric Corp.
F. W. Woolworth Co.

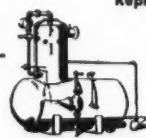
And there are hundreds more ELGIN users almost equally well known!

ELGIN SOFTENER CORPORATION

180 No. Grove Avenue, Elgin, Illinois

Representatives in Principal Cities

In Canada: G. F. Sterne & Sons Ltd., Brantford



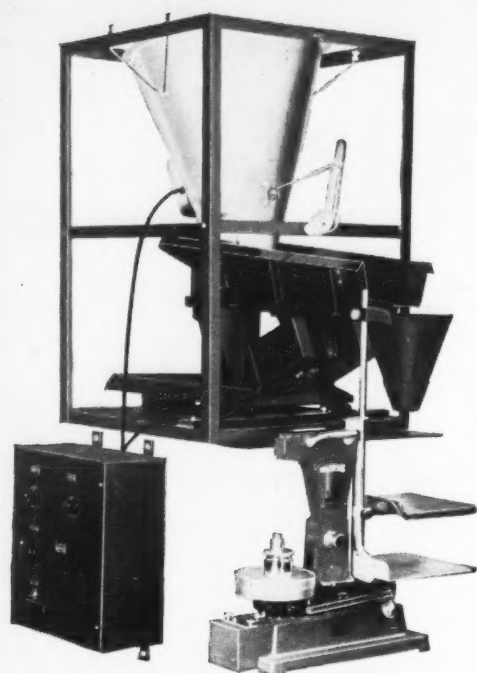
DEAERATING HEATERS—supply make-up water pre-heated by exhaust steam in which CO₂ and oxygen are eliminated.



WATER FILTERS—Diatomite, sand, anthracite, activated carbon and oil removal filters in all types and sizes.



When inquiring check 3465 opposite last page



Precision Weigh Filling Machine for Packaging

This Exact Weight machine is ideal for filling any free flowing material into bags, boxes or cartons. Precision fill is assured by electronic controls connected with an Exact Weight precision industrial scale.

Model 1001-FM-2-30, illustrated, is extremely flexible and will economically handle any quantity from a few pounds up to 25 pounds. Vibratory feeder with adjustable fast to trickle feed insures greatest accuracy on every package. Visible indication permits accurate check by operator to maintain constant weight.

Other Exact Weight weighing machines are available with either automatic or semi-automatic controls. They are widely used in the chemical industry for packaging, bagging, batching, compounding and weigh feeding into processing machines. Capacities from a few grams up to 150 pounds. Write for complete information.

Sales and Service Coast to Coast

Exact Weight

Better quality control

Scales

Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio

In Canada: P. O. Box 179, Station 5, Toronto 18, Ont.

When inquiring check 3466 opposite last page



Cases come from conveyor into filling station, where containers are filled and capped. Set-up allows Los Angeles Soap Co. to fill around 22,000 containers per shift

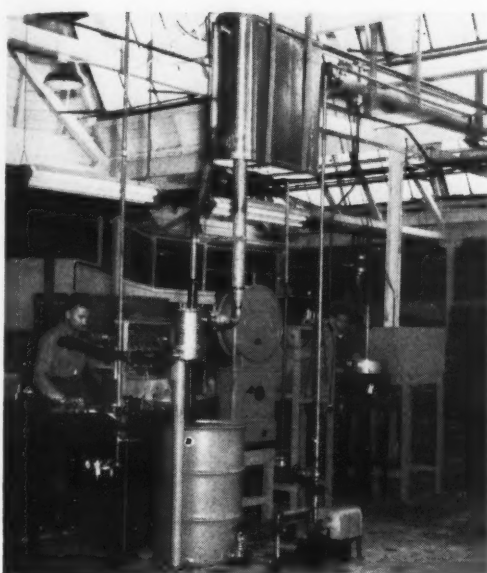


To lower filling head and fill containers, operator steps on pedal switch. When material appears in transparent overflow line, operator steps off switch to stop filling

Filling squeeze cans and plastic bottles with liquid detergents is not a simple task . . . there is always sudsing to contend with. Los Angeles Soap Co., with a comparatively simple and inexpensive machine, solved problem of . . .

Problem: Liquid detergent is extremely difficult and expensive to package with conventional fillers because:

- ordinary siphon fillers are slow, they drip and mess up containers
- there is quite a bit of foaming with vacuum fillers, and it is difficult and expensive to store and settle suds effectively
- automatic equipment is expensive to buy and operate
- trend to flexible containers which buckle and collapse under vacuum calls for equipment that can handle both flexible and rigid containers
- removing cans from case to fill requires additional equipment that adds to labor costs, but not to product value.



Material comes from main storage tank on roof to storage tank above filler. Float valve assures constant pressure above filling head. Overflow goes into drum, from which it is pumped back to main storage tank

filling liquid detergent without sudsing

Because of these difficulties, Los Angeles Soap Co. had a custom packer in Chicago package liquid detergent for them. Having it done this way eliminated investing in filling and packaging equipment.

Solution: With the recent introduction to the field of a simple, inexpensive filling machine that produces no suds, Los Angeles Soap was able to switch filling and packaging operations to their plant.

Simple filling action of this machine is as follows: Filling tube allows liquid under pressure to be ejected against sides of container where it flows smoothly and fills without sudsing. When fill reaches bottom of tube (short distance below container spout), it is vented through plastic over-

(Please turn to page 154)



**Your product
will arrive
and stay**

- **CLEAN**
- **PURE**
- **SANITARY**

when shipped in

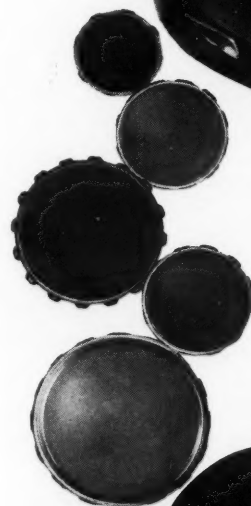
VULCAN

Steel Containers



with Protective

HI-BAKE linings



Because Vulcan stocks the widest selection of Hi-Bake lined pails possible, manufacturers of chemicals, foods, drugs, oils, fertilizers, paints, varnishes and other hard-to-hold products have turned to Vulcan. They find Vulcan's years of experience coupled with constant field and laboratory research invaluable in solving their lining problems.

Do what so many others have done... bring your lining problems to Vulcan *first*. Let Vulcan's chemists lining-test your product. They will develop a Hi-Bake lining that will meet your most rigid specifications... one that will protect and maintain the quality and uniformity of your product. It will pay you in time and money saved.

Samples gladly supplied on request. Call or write today.



Over 40 years Container Experience

VULCAN
CONTAINERS INC.

Bellwood, Illinois
(Chicago Suburb)
Phone Linden 4-5000

In Canada:
Vulcan Containers Ltd.
Toronto 15, Ontario

Representatives in all
principal cities
See "Pails" in Classified
Phone Directories

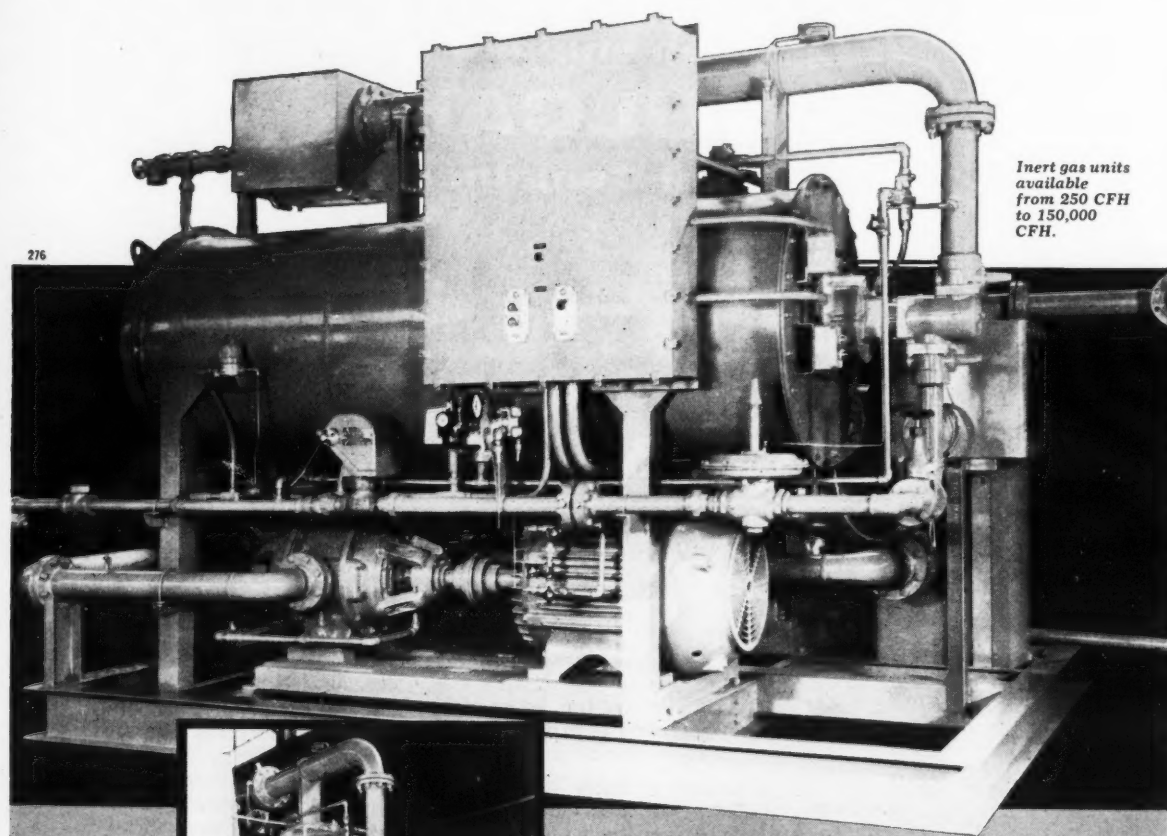
When inquiring check 3467 opposite last page

Here's the Industry's Most Advanced Inert Gas Generator

HERE's the packaged inert generator industry has been waiting for. It comes complete, ready to hook "on line" and go to work. The desirable single burner design eliminates control problems, assures constant analysis gas whether operating at 20% or 100% of capacity. Any gaseous fuel or light fuel oil can be safely used, including pure hydrogen for the production of nitrogen. Combustion chamber and heat exchanger are of stainless steel—designed to reduce surface temperatures well below safety margin.

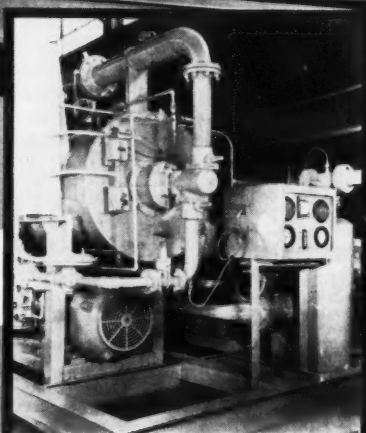
Electrical circuits permit automatic purge and safe start in accordance with Factory Mutual and Insurance Underwriters codes.

But we've only scratched the surface—be sure you get all the facts on the advanced Gas Atmospheres packaged units before you buy.



Inert gas units available from 250 CFH to 150,000 CFH.

End view shows modern control and simplicity of single burner construction.



gas Atmospheres, inc
equipment for producing industrial gases
20011 WEST LAKE ROAD CLEVELAND 16, OHIO

packaging & shipping



IT'S IN THE BAG!

Foil layer keeps moisture, odors in or out

Multiwall paper bags employing protective qualities of aluminum foil are now being marketed on a regular order basis. The barrier, formed by laminating foil to kraft paper, gives maximum protection against moisture, odor and gases. Results of more than three years of testing show that the rate of moisture-vapor-transmission is so slight as to be almost impossible to measure. Foil barrier



Contents in foil-laminated multiwall bag were as moisture-free after as they were before downpour in shower stall "test lab"

When inquiring check 3468 opposite last page



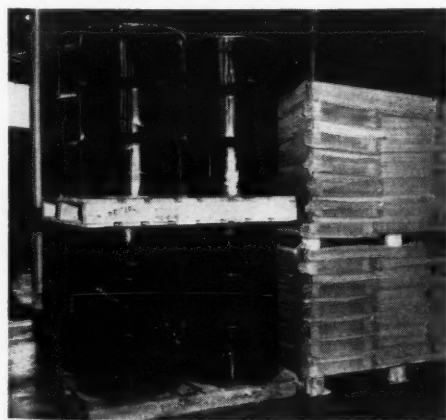
Multiwall bag has moisture- and odor-protective barrier of aluminum foil laminated to kraft paper

also blocks odor of contents from seeping through other piles and prevents outside odors or gases from being absorbed into the bag itself.

In standard form, the bags have a sheet of 0.0035" foil, laminated to 40-lb kraft, positioned between inner and outer plies. Other constructions, such as polyethylene extruded on foil, foil laminated by polyethylene to kraft, and bags with foil in various ply positions, will also be available. These constructions will be used where extra-sure resistance to moisture and gas penetration is necessary and where product needs special protection against grease deterioration and chemical corrosion.

The bags are expected to handle many of the jobs

(Please turn to next page)



In storing empty containers, bags with 192,000 lb capacity occupy same space as drums having only 3200 lb capacity



Another first for 3M Research...

NOW...POLYESTER FILM YOU CAN HEAT SEAL!

Impossible? Not any more! "Scotchpak" Brand Polyester Film takes a seal as tough as the film itself—and easily: a temperature of 275° to 359°F. and 20-60 psi is all that's required.

"Scotchpak" is the perfect packaging material for critical applications where inertness of the wrapper and protection of the contents under extreme temperature conditions is vital. It resists most solvents and chemicals, has high moisture inertness and high tensile strength.

You can use "Scotchpak" for packaging such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup and mustard, surgical dressings—and many others. It even makes an ideal container liner or insulation pillow.

For more information, send for the folder described at right.

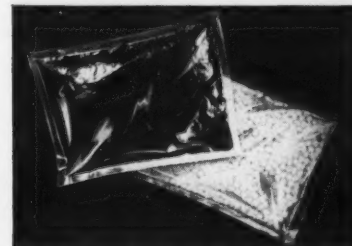
TRADEMARK
"SCOTCHPAK"
BRAND

HEAT-SEALABLE POLYESTER FILM

The term "SCOTCHPAK" is a trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario. © 3M Co., 1956.

When inquiring check 3469 opposite last page

**Look what you
can do with it!**



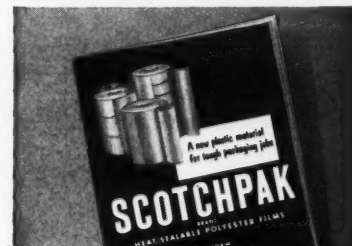
ACIDS or volatile chemicals can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "Scotchpak" Polyester Film. Also lines drums and cartons.



FOOD ITEMS are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled right in the package. Low gas penetration rate . . . inert and non-toxic.



METAL PARTS can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.



FREE FOLDER shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group, 3M Co., St. Paul 6, Minn., Dept. OL-57.





BAGS, BULK, BARRELS, BOXES MECHANICALLY!

You can save time and money with increased safety by installing a Cesco Skip-Hoist Dumper. Lifts, upends and dumps 100 loads per hour with a lifting capacity range from 100 to 1500 lbs. Single and multi-purpose portable models in standard heights from 6 to 10 ft. Stationary models to 20 ft. Easy, safe operation from push button controls speeds up material handling and eliminates accidents.

Write for complete catalog...

ESSEX CONVEYORS, INC.
165 Franklin Avenue, Nutley 10, N. J.

COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, California

CESCO DUMPERS

When inquiring check 3470
opposite last page

PACKAGING & SHIPPING

Multiwall Bags

(Continued from preceding page)

that more bulky containers are doing in shipping semi-solids, and plastics and solid chemicals in the hygroscopic, deliquescent and anhydrous groups.

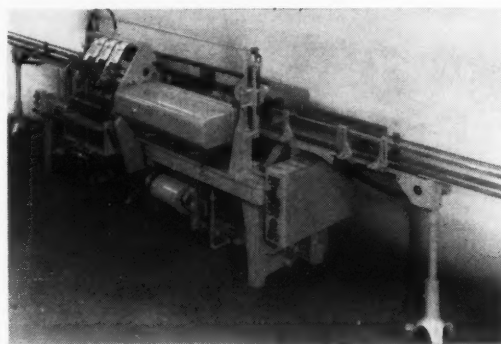
("Foil-Wall" bags are manufactured by Hudson Pulp & Paper Corp., Dept. CP, 477 Madison Ave., New York 22, N.Y. . . . or for more information check 3471 on form opposite last page.)

Straight-line labeling machine continuously and automatically handles glass containers . . .

automatic systems adjust machine speed to changes in container flow

Uses: High-production labeling of glass containers — unit will not handle tin or fiberboard containers.

Features: Automatic control systems reduce operating speed when flow of containers is reduced. As flow returns to normal, labeler adjusts itself to original speed. The "no-bottle no-label" control operates electrically. Machine can be equipped for multiple labeling of same container.



Straight-line labeler has positive container control and continuous motion to assure uninterrupted flow of glass containers

Description: Straight-line operation spaces and controls containers throughout entire machine cycle. Speed-control system is air-operated. Electrically operated controls monitor any line stoppage after the labeler. In labeling operation, center of label first contacts the container. Pneumatically controlled pressure pads firmly bond label in place.

(Super C. M. labeling machine is manufactured by Economic Machinery Co., Div. of Geo. J. Meyer Mfg. Co., Dept. CP, 60 Fremont St., Worcester 3, Mass. . . . or for more information check 3472 on form opposite last page.)

PROTECTIVE'S

DRUM LINERS • BAGS • CARTON LINERS

. . . all styles, all sizes, produced with fine materials: Polyethylene, Vinyl, Laminates and other flexible films — all at surprisingly LOW PRICES!



*Double-Seal Guaranteed Safety . . .

SUCCESS!

"TWIN-SURE" DOUBLE-SEAL

straight bottom liners

"POWER-SEAL"

round bottom liners

. . . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

... here are just a few users of protective liners:

Allied Chemical & Dye Corp.	McKesson & Robbins, Inc.
The Borden Company	National Lead Company
Brookhaven National Laboratories	Chas. Pfizer & Co., Inc.
C-O-TWO Fire Equipment Company	Swift & Company
E. I. duPont de Nemours & Co.	Union Carbide & Carbon Corp.
Endicott Johnson Corp.	U. S. Quartermaster Corps
General Electric Company	

Guaranteed Satisfaction • Free Consultation • Free Samples Write Dept. CP-57

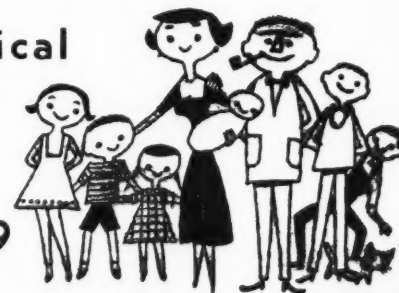
PROTECTIVE LINING CORPORATION

GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

*©TM

When inquiring check 3473 opposite last page

alphabetical
index
on
page 249



. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 249. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want . . . in a hurry!

STAPCO

IF IT WILL FLOW Will-Flow WILL PUMP IT!

Adhesives, inks, chemicals, foods and drugs of semi-solid or heavy liquid consistency are just a few materials efficiently transferred from one point to another through lines by Will-Flow Systems.

Pumped directly from drum-sized containers, materials are fully protected from contamination by Will-Flow. All parts in contact with the product are constructed of 18-8 stainless steel or similar materials. Models available to handle various capacities.

Will-Flow is fully automatic in operation and delivers materials to points of use at uniform pressures without spillage, wastage, or loss through evaporation. Improves plant housekeeping conditions and lowers material handling costs.

If it will flow, Will-Flow will pump it! Write for full information.

A Complete Engineering Service

STAINLESS PRODUCTS CORPORATION

BELDING, MICHIGAN

When inquiring check 3474 opposite last page

SOLVE YOUR Packaging Problems with LERMER PLASTIC CONTAINERS!

Example:

E. R. Squibb & Sons desired a container which would dispense just one capsule at a time. LERMER engineers developed such a dispenser in record time... at a price far lower than thought possible.

Write for complete catalog.

LERMER Containers are:

- shatterproof, assuring long life.
- 75% lighter than glass, effecting enormous savings in shipping.
- available clear or opaque in a multitude of lustrous colors.
- can be handsomely decorated and printed during manufacture to carry your story.



LERMER PLASTICS, INC. 530 SOUTH AVE. GARWOOD, N. J.

REPRESENTATIVES IN THESE CITIES: Rochester, Philadelphia, Memphis, Miami, Cincinnati, Columbus, Cleveland, Chicago, Detroit, Minneapolis, San Francisco, Los Angeles.

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS

When inquiring check 3475 opposite last page

MAY 1957

PACKAGING

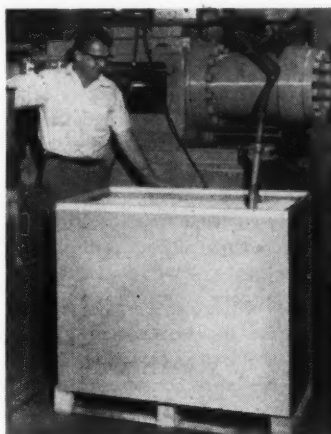
Solves plastic resins shipping problem...

taped edge of corrugated bulk container stops contamination

Uses: Container prevents contamination of plastic resins and other raw materials.

Features: Taped edge of container prevents contamination of contents by tiny paper fibers which rub off container edges during shipment.

Description: Corrugated container is made up of top and bottom lids and two sleeves. Edges of sleeves are protected

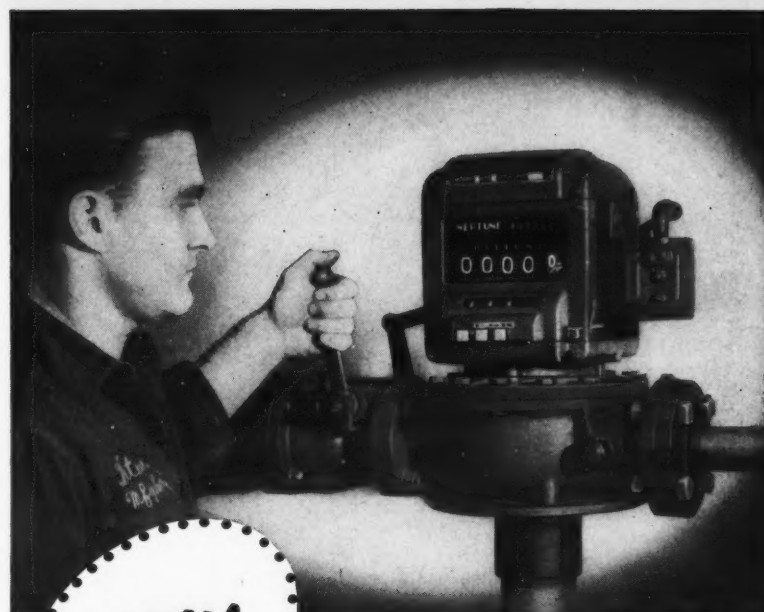


Note taped edge which prevents contamination of resin during shipment

with kraft tape. In setting up box, bottom lid is placed on inner sleeve, box is turned right-side up, and outer sleeve is dropped over inner sleeve and bottom lid. When container is filled, top lid is placed in position and container is secured with steel strapping.

Wrapping containers while in storage, prior to being set up, furthers prevention of product contamination. Only one pallet load at a time is unwrapped when setting up containers.

(Corrugated bulk container with taped edge is product of St. Regis Paper Company, Dept. CP, 150 East 42nd St., New York 17, N. Y. . . . or for more information check 3476 on the convenient Reader Service slip which is located opposite last page.)



NEW

METER WITH A MEMORY... NEPTUNE REPEATING AUTO-STOP

Set it once...delivers same quantity

of liquid batch after batch

You batch faster, free operator's time for other duties, and prevent setting errors with this *repeating* Auto-Stop meter. Set the quantity required by the formula just once, simply by pressing buttons. Then open the valve and the meter does the rest. It shuts off automatically at the exact amount. The meter "remembers"... delivers the same amount each time the valve is opened until reset for a different quantity.

Neptune meters end spoiled batches, overfilling, spillage and slow weighing. No more buckets or gauge sticks. Meters are safer, too. Hazardous liquids stay inside the pipe.

You can now meter hundreds of liquids... hot and cold water, syrups, oils, solvents, soap solutions and many chemicals. Auto-Stop meter capacities 5 to 300 gpm. Other Neptune features include ticket-printing registers and electrical Auto-Switch (shown above) to control pumps, valves or signals. Neptune Meters with simple counters or dials also available from 3/8 to 6 in. Ask for free technical metering Bulletin 566-O P.



NEPTUNE METER COMPANY

19 West 50th Street, New York 20, N. Y.

Branches ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES
in: LOUISVILLE • No. KANSAS CITY, Mo. • PHILADELPHIA • PORTLAND, ORE.
SAN FRANCISCO (Millbrae) • IN CANADA: TORONTO 14, ONT.

When inquiring check 3477 opposite last page

FISCHBEIN Portable BAG CLOSER

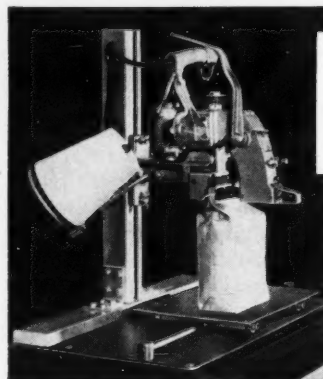
HANDLES ALL TYPES OF BAGS!

- Total weight: 10½ lbs.
- Requires no installation... plug into any outlet
- Simple to operate and maintain
- Lowest priced bag closer on market

FULLY GUARANTEED!

OPTIONAL SUSPENSION
UNIT ADAPTS MACHINE
TO STATIONARY USE

NEW! FOR CLOSING SMALL BAGS!



FISCHBEIN
TABLE MODEL
CARRIAGE
CONVEYOR
(Model FS)

One simple knob locks any Fischbein Portable Bag Closer into proper sewing position. Carriage slides freely and returns automatically to starting position, ready for next bag.

UNIQUE VERSATILITY! Any Fischbein Bag Closer can be used 3 different ways!

1. Completely portable
2. Suspended with counterbalance
3. On carriage conveyor for closing small bags

FOR DETAILS, MAIL THIS COUPON TODAY!

DAVE FISCHBEIN CO., DEPT. 9B
2730 30th Ave. S., Minneapolis 6, Minn., U.S.A.

Name _____
Firm Name _____
Address _____
City _____ Zone _____ State _____

PACKAGING & SHIPPING

Filling Liquid Detergent

(Continued from page 149)

flow tube. Presence of material in transparent overflow tube tells operator when all cans are full.

When tube is raised, valve closes, shutting off flow of liquid. At same time, a siphon is created in vent-tubing so that any excess drips on outside of filling tube are sucked up. Hence, a drip-free filler without vacuum.

Liquid detergent comes from stainless-steel storage tank on roof. Material feeds from this tank into large stainless-steel tank above filler. Float-operated valve assures constant head pressure at filling machine. Material going from tank to filling head passes through a filter.

Overflow from head goes into a drum. About once a day, material is pumped from drum back to storage tank, on roof.

Cases containing empty cans or bottles come off conveyor and are centered by operator under filling head. Stepping on foot-operated electric switch lowers head and fills containers. When all containers are filled, operator raises head by stepping off switch pedal. He then pushes case down line where another operator drops caps over cans' spouts. Third man tightens caps with a single-head cap tightener. Case is then pushed onto automatic case-sealing machine.

Results: Since there is no sudsing or dripping, containers are filled right in the case. Average filling rate is about 22,000 twelve-oz containers per shift... there are no loose containers to tip over and hold up line. Overflow action assures full containers.

Initial cost of filler was so low that Los Angeles Soap realized it would be cheaper for them to fill and pack themselves. One year's savings on freight cost of shipping this product from Chicago has paid for all equipment purchased. And they know as the market varied from rigid to flexible containers, no new equipment will be needed.

("Siphon-Sip" filling machine* is manufactured by Laub Engineering Co., Dept. CP, 3059 W. Valley Blvd., Alhambra, Calif. Check 3479 on form opposite last page.)

*Patent Pending

CP's large page size...

... is a big help in presenting articles for clarity, readability, "impact." Read what Art Editor Harley Lichtenberger has to say about this "editorial acreage."

... on page 213

use JARS



OR
VIALS

You can package it better at less cost in a **Clearsite** plastic container

- ▶ 1/5 the weight of glass
- ▶ Shatter-proof
- ▶ Easy to print
- ▶ Moisture tight, dust free

There is a wide variety of shapes, sizes, colors and closures available to give your particular product extra sales sparkle. Write for free samples and descriptive literature to Dept. G.

CELLUPLASTIC CORPORATION

Sales and Executive Offices Newark, New Jersey

When inquiring check 3480 opposite last page

Viscous Materials FLOW LIKE WATER through Parks-Cramer Jacketed Pipe and Fittings

You can't find a better way to convey asphalt, rosin, wax, sulphur, gums, syrups, or other high melting point solid or viscous materials than through Parks-Cramer Jacketed Lines.

Steam, hot water, hot oil, or Dowtherm keep the contents in a quick moving liquid state. Plug-ups are eliminated.

Jacketed Valves and Fittings are stocked in Semi-Steel with Ductile Iron, Ni-Resist, Steel and Stainless Steel available on order.

Piping, Valves and Fittings are stocked in Semi-Steel and are available from 1¼" to 8" line size. These include two- and three-way Valves, all standard fitting types, as well as Expansion Joints, Strainers, Flexible Hose and Relief Valves.

Write for Catalog 356



Parks-Cramer Company
Fitchburg 12, Mass., U.S.A.

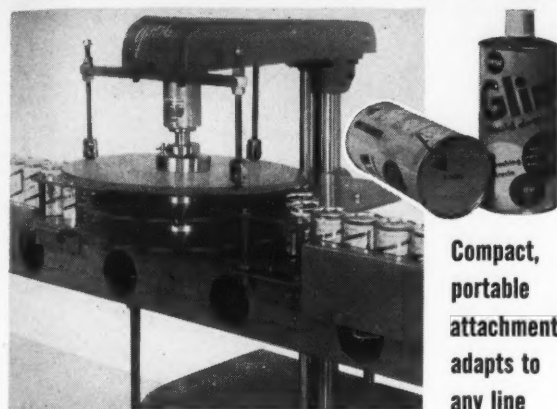


When inquiring check 3481 opposite last page

CHEMICAL PROCESSING

When inquiring check 3478 opposite last page

New way to Code Cans, Jars, Bottles



Compact,
portable
attachment
adapts to
any line

The Gottscho "Model TB" MARKOCODER® machine is a unique, fully automatic, packaging line attachment for coding bottoms of cans, jars, bottles, canisters, paper containers at speeds up to 600 per minute. Makes consistently clean, permanent ink imprints. Designed for quick code changes, simple maintenance, easy adjustment for different size cans. Offers all the advantages of a fixed-installation imprinter without requiring alteration of present line set-up.

Write for descriptive circular "TB" . . . and ask about Gottscho conveyor-line case printers too.

Gottscho

ADOLPH GOTTSCHO, INC.

Dept. W, Hillside 5, N. J.

Automatic Production-Line CODING, MARKING, IMPRINTING MACHINES
In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

When inquiring check 3482 opposite last page

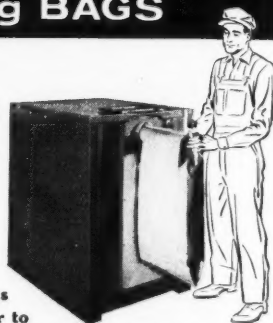
CUT COSTS for Packing BAGS

FILL and WEIGH with

CODDINGTON
AUGER-MATIC
Bag Packer

Low Cost, portable
AUGER-MATIC packs
any material from powder to
pellets in paper bags . . . shuts off automatically
when desired weight is reached.

Valve bags fit snugly on **AUGER-MATIC** spout so
no dust escapes . . . keeps bags clean . . . elimi-
nates costly tying or bag closing equipment.



-----FILL OUT AND MAIL TODAY-----

E. D. CODDINGTON MFG. CO.
5036 N. 37th Street, Milwaukee 9, Wisconsin

Please send me facts on Cutting Valve Bag Packing Costs

MY NAME.....

COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....

When inquiring check 3483 opposite last page

MAY 1957

PACKAGING

**Label resists attack
by heat, oil,
grease . . .**

lab tests reveal increased bind-
ing power under heat

Pressure-sensitive, oil-resistant label
grips with increasing tightness un-
der heat exposure. Designed for
rugged application under adverse
conditions, smooth-surface label
resists attack from heat, oil, grease,
dirt, and many chemicals and acids.

Lab tests utilizing blued steel sur-
face revealed oil-resistant label
passes through two specific ad-
hesion phases when exposed to
heat for varying periods of time.

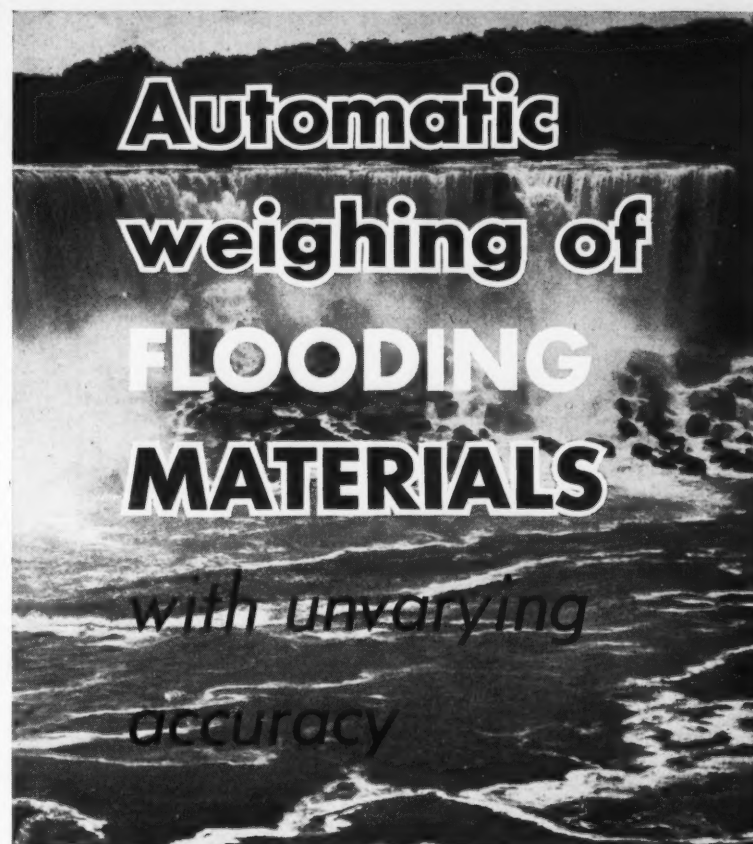
First phase, primary heat bond,
occurred after five hours of ex-
posure at 300°F. This was broken
only by overnight submersion in
aromatic or aliphatic solvent, or by
determined scraping. Second phase,
an absolute heat bond, took place
after sixteen hours exposure at
300°F. Six day submersion in sol-
vents did not weaken it materially,
and it was removed only by severe
scraping with sharp instrument.

(Oil- and heat-resistant labels are
manufactured by Avery Adhesive
Label Corporation, Dept. CP, Mon-
rovia, California . . . or for more
information about manufacturer's
product reader may simply check
3484 on the convenient Reader
Service slip opposite last page.)

**Custom-makes partitions
for package interiors**

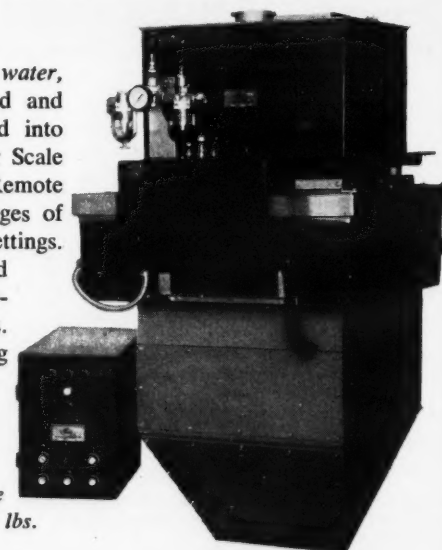
Brochure in two colors describes
firm's custom-engineered inter-
ior-packaging for industrial ap-
plications. One example shows
how a designed interior enabled
356 additional units to be
packed into a master carton
without increasing its size.

Interior packaging brochure is
issued by Paper-Wood Special-
ties Company, Dept. CP, 7990
Rockwell Avenue, Philadelphia
11, Pennsylvania. When inquir-
ing about manufacturer's prod-
uct reader may simply specify
3485 opposite last page.



*Only Thayer Scales have the Thayer Plate Leverage System
that is guaranteed accurate for the life of the scale.*

Flooding powders, and even water,
can be positively controlled and
accurately batched or filled into
containers with this Thayer Scale
Autoweighting System. Remote
controls permit quick changes of
materials and weight settings.
Amazing accuracy is retained
regardless of shocks or sur-
rounding dust conditions.
Please write for engineering
data.



**MODEL B-36R Models available
for batches from 5 to 5,000 lbs.**

**THE Thayer
SCALE**

BATCHING • FILLING • CHECKING—AUTOMATICALLY BY WEIGHT

AUTOWEIGHTION

THE THAYER SCALE CORP., 6 Thayer Park, Pembroke, Mass.

When inquiring check 3486 opposite last page

SAFE

moisture and fume
removal



Three outstanding features make Air-Van Power Exhausters especially suited for exhausting moisture and corrosive fumes.



Direct Drive
150 to 11,000 CFM.
S.P. to 4".

Belt Drive
3,000 to
65,000 CFM.
S.P. to 4".

- A patented scroll design assures positive air removal. Gallaher Air-Vans are designed to handle up to 65,000 CFM at static pressures to 4".
- The motor is out of the air stream.
- A patented air seal-off protects the motor by creating a constant curtain of fresh air around the motor shaft. This prevents any fumes from entering the motor housing.
- Other Air-Van features include quiet operation, low silhouette, weather-proof design, availability in special metals and finishes and certified ratings based on actual physical tests.

Patents 2188741. 2526290
Patents pending

The GALLAHER Company

4108 Dodge Street
Export Office: 306 Paul Bldg., Utica 2, N.Y. Cable "Keiserquip"
Omaha, Nebraska

When inquiring check 3487 opposite last page

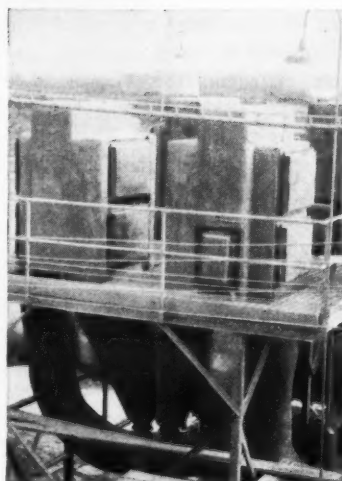
CASE HISTORY #721 INDUSTRY: Chemical

PLANT: Butler Chemical Co., Galena Park, Tex.

PRODUCT: Defluorinated Phosphate

PROBLEM: To end an air pollution nuisance and recover saleable product being lost at the feed end of a calcining kiln. Collector specifications and performance must be guaranteed operative at 600°F. to prevent gumming and sticking of product caused by condensation.

SOLUTION: A 224 tube Dustex D-400 Dust Collector in a double bank tandem arrangement. Maintenance of 600°F. temperatures were possible because of the Dustex design incorporating an unobstructed inlet plenum and small cyclone tubes positioned in the clean gas exhaust plenum. This design feature maintains tubes at system temperature thus preventing any possibility of condensation.



RESULT: Elimination of pollution problem — economies resulting from product recovery have written off cost of Dustex unit.

P. O. BOX 2520



BUFFALO 25, N. Y.

When inquiring check 3488 opposite last page

safety

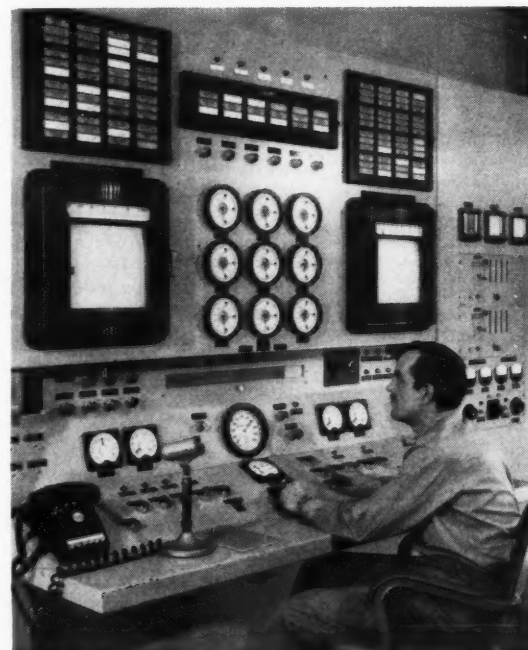
At Argonne National Laboratory, the nation's first nuclear-powered electricity-generating plant is now in operation. Larger units are being planned and built. Many may be operating near densely populated areas, so of utmost importance are . . .

SAFETY ASPECTS OF A

When the first experimental boiling water reactor (EBWR) for generation of electric power went into continuous operation at the Argonne National Laboratory (CHEMICAL PROCESSING, April 1957, p 14), a big step was taken in making nuclear energy work for man — in his home and industry. The direct-cycle boiling water reactor is considered by many to be about the safest for operation near densely populated areas. Not only does it have inherent safety characteristics, but its design is such that it eliminates need for an intermediate heat exchanger — resulting in lower oper-

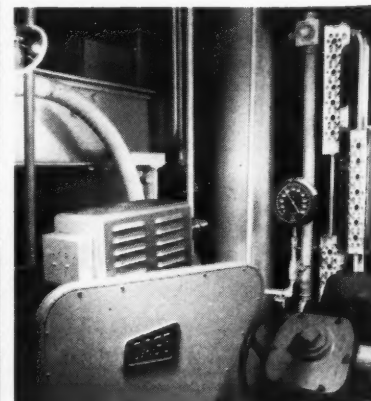
ating pressures and, in turn, lower temperatures.

EBWR's inherent safety stems from the fact that formation of steam bubbles tends to control the chain reaction. Since the reaction is dependent upon having a water moderator in the core, steam bubbles create voids by forcing water out from between fuel plates. Experiments in which large amounts of reactivity were suddenly added showed that this type of reactor would eject such large amounts of water from the core in a few thousandths of a second that the reactor would automatically shut itself

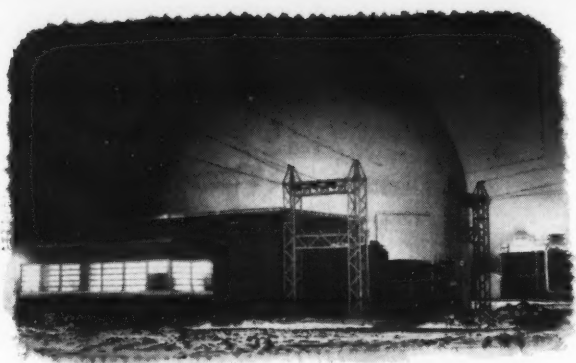


Part of panel from which reactor is controlled. Note elaborate annunciator system at top of console

Remote TV camera trained on reactor water-level gage. Camera can be rotated to view other equipment and gages in the general area



CHEMICAL PROCESSING



F A BOILING WATER REACTOR

down. Only after a great deal of complicated preparation was it possible to create a situation in which the reactor damaged itself.

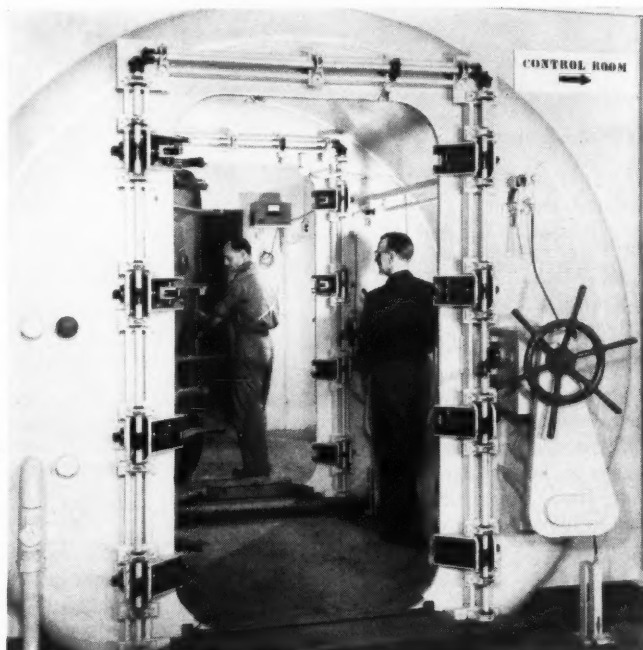
The plant at Argonne will be used primarily for experimental purposes, so it has, in many respects, been overdesigned from a safety point of view. Nevertheless, many of its features will be incorporated into the larger plants now being built.

From an over-all safety standpoint, primary concern is to prevent escape of radioactive products, either by leakage or explosion. Fuel elements, where largest concentration

of radioactivity exists, have been clad with zirconium. They are tightly welded and tested to assure that no radioactive particles can escape and that no water can enter to corrode the uranium itself. Zirconium was chosen for its resistance to corrosion as well as its favorable nuclear properties.

The most dangerous situation imaginable is that which could cause fuel elements to melt and allow fission particles to escape from the cladding. However, with its present core and natural convection cooling, the reactor should be able to operate at least at

(Please turn to next page)



Double airlock insures pressure-tightness at exit of power-plant building

NOW YOU CAN

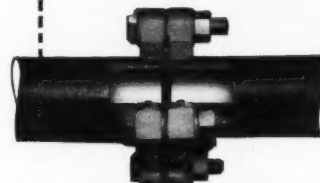


CARRY A SPARE...

for rubber lined piping systems

Rubber lined piping has more than proven its superiority in thousands of anti corrosion and anti abrasive applications. However, as in any piping system, occasional repairs are necessary.

Heretofore, these repairs meant shutting down the line, sending detailed drawings for new pipe and an indefinite period of waiting during which both production output and financial income suffered.



A pressure proof connection can be effected in only 2 minutes the Fieldlink way.

Now, with the La Favorite "Fieldlink"® method of joining rubber lined pipe, the ailing section, whether it be a single section, or hundreds of feet, can be easily replaced without so much as the loss of a days production.

Prepared pipe and fittings are available from stock in 20 foot lengths. Additional lengths can be quickly prepared at your own plant by any pipe fitter, on any standard pipe machine.

(If required, grooving and counterboring tools can be obtained from La Favorite)

LA FAVORITE *Rubber Mfg. Co.*

578 267 Wagaraw Road • Hawthorne, New Jersey

Yes, I want to know more about the Fieldlink method of joining rubber lined pipe in my own plant.

☐ Send me descriptive bulletin 2958

☐ Send a representative to explain in person

NAME.....POSITION.....

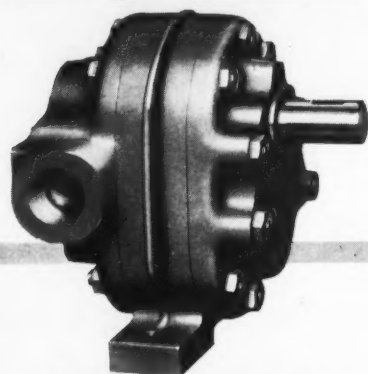
COMPANY.....ADDRESS.....

CITY.....STATE.....

CLIP THIS COUPON
FOR A
BIG DIVIDEND

When inquiring check 3489 opposite last page

Handling Hazardous Liquids?



LET ROPER DEVELOP A SAFER SYSTEM FOR YOU

The advantages and safeguards of pumping hazardous liquids from a remote power source are yours with Roper Hydraulic Pump-Motors. In such instances, these rotary gear units act as the remote prime mover pumps in hydraulic circuits, and as low speed, high-torque motors to drive product pumps. Flexibility, reversibility, and dependability earmark Roper units as highly desirable where safety is paramount. Send for data on single and double shaft models — sizes to develop up to 11.5 H.P.

Advantages of Roper Hydraulic Pump-Motors

1. Can be used with existing hydraulic equipment to replace manual operations, or to replace gear trains or mechanical controls.
2. Especially suited for explosion-proof applications.
3. Can be stalled without damage to themselves and other equipment.
4. Provide positive control over wide range of operating conditions.
5. Compact and space saving.
6. Provide increased flexibility of installation.
7. Cut maintenance costs.

ROPER
Rotary Pumps

Ask for Bulletin 22
GEO. D. ROPER CORP.
745 Blackhawk Park Ave.
Rockford, Illinois

When inquiring check 3490 opposite last page

SAFETY

Boiling Water Reactor

(Continued from preceding page)

four times its rated level without melting even the hottest portion of the fuel. If a situation should arise where the reactor could not be handled by its control rods, the chain reaction could be immediately stopped by injecting a boric-acid poisoning solution.

The reactor pressure vessel, with its 23/8" walls, will hold considerably more than the 600-psi normal operating pressure (it was previously tested at 1200 psi). Furthermore, the reactor is encased in steel and concrete, and so designed that if an explosion should occur, all fragments would be directed downward to base of building.

Power plant is designed to prevent escape of radioactive products in case of leaks or failures. Building is an 80'-diam by 119'-high air-tight steel shell, lined with one foot of concrete or the equivalent. Lining prevents penetration of shell by fragments. Underneath portion of shell is protected by seven feet of concrete. Double airlock insures pressure-tightness at the exit. Shell was found to be air-tight when tested over an eight-day period at 15 psig.

For steady operation and for protection against mishaps, an elaborate system of automatic controls and alarms is installed. About 100 alarm points on annunciator panels tell operator when an abnormal situation develops which needs attention. If alarm goes unheeded, corrective action in form of automatic shutdown is taken before the situation becomes dangerous.

An interesting safety feature is use of a television camera to view water level in reactor pressure vessel. Camera can be rotated to view other equipment and gages in general area. Complete plant is operated by remote control from adjoining building. ■

Discusses fire-extinguishing solutions

Eleven-page report (PB 111913) describes 24% aqueous solution of lithium chloride as being suitable for extinguishing fires at wide range of temperatures down to -54°C. At this temperature, viscosity is low enough for solution to be expelled from pressurized fire extinguisher.

Second report of 41 pages (PB 121036) discusses evaluation of halogenated hydrocarbons and alkali-earth/metal-salt fire-extinguishing agents for low temperatures. Lithium chloride and lithium-chloride/calcium-chloride/water solutions are recommended for use in class A fire extinguishers. Halogenated agents were found impractical because of toxicity and density of pyrolyzed vapors.

PB 111913 (remit \$0.50) and PB 121036 (remit \$1.25) may be obtained directly from Office of Technical Services, U. S. Dept. of Commerce, Dept. CP, Washington 25, D.C.



Interlocked super-safety GRATING

Dravo I-U-2 safety grating is particularly desirable in areas for public use. Bearing bars are 3/8" thick, spaced 1" or 1 1/2" apart. Cross bars are 2" center to center. Note spacing—an object over 1/2" square cannot pass through the openings.

For information, write Dravo Corporation, Dept. D-2705, Pittsburgh 22, Pa.

DRAVO
CORPORATION

When inquiring check 3491 opposite last page



NEW! Tissue-Thin Pylox™ Gloves Nimble Fingers™ by PIONEER

Thinner than surgical gloves for jobs requiring extreme finger sensitivity. Wear all day in comfort. Resists normal acids, alkalis, oils, greases, some solvents. Smooth outside, textured inside . . . reversible for non-slip grip. Sizes small, medium, and large. Let PIONEER help you select proper gloves for your job from the complete PIONEER line.

The PIONEER Rubber Co.
241 Tiffin Road, Willard, Ohio, U.S.A. V-10
Please send me:
The name of my nearest PIONEER Glove Distributor.
1956-57 PIONEER Industrial Glove Catalog.
Hand Protection Clinic glove recommendation for job described in enclosed letter.

Firm _____
Address _____
City _____ Zone _____ State _____
Signed _____

Mail
This
Coupon
Today

When inquiring check 3492 opposite last page

CHEMICAL PROCESSING

Eyeshield is designed for better ventilation

Baffle arrangement around lens "screens out" splashes, dust and other foreign material

Uses: Protecting the eyes when there is the danger of splashing chemicals, dusts, and other foreign material.

Features: Eyeshields have been designed for increased comfort to wearer: Improved ventilation system; light weight (3 oz); soft vinyl nose-pad, and size to accommodate personnel wearing



Eyeshield has large ventilation area around lens

eyeglasses with widest type frames. Design permits air to flow freely and eliminate fogging of lens.

Description: Ventilation is accomplished by series of baffles around greater part of lens. Further screening is obtained by incorporation of stainless steel 20-mesh screen.

Lens is tilted in toward cheekbones to permit full vision downward. Optical plastic lenses are replaced without tools, and are claimed to meet specifications for optical quality as well as impact and pierce resistance.

("Airflow Chem" eyeshield is supplied by United States Safety Service Co., Dept. CP, 1215 McGee St., Kansas City 6, Mo. . . . or for more information check 3493 on form opposite last page.)

Offers tips for safe handling of mixed acids

Safety data sheet itemizes properties and other essential information for safe handling and storage of mixed acids. Includes information on shipping containers, storage, waste disposal, medical management and employee safety.

Chemical Safety Data Sheet SD-65 may be obtained for 30c from the Manufacturing Chemists' Assn. Inc., Dept. CP, 1625 Eye Street, Northwest, Washington 6, D.C.



Fairbanks-Morse fire pumps provide 12,000 gpm. of water at 100 psi. for each of two systems.

World's largest jet aircraft center protected by F-M fire pumps

Four major aircraft companies—Lockheed, North American, Convair and Northrop—use the 5000-acre U. S. Air Force Plant No. 52 at Palmdale, Calif., for assembly and testing.

Maximum protection against fire at this gigantic operation was achieved at minimum cost by installing two identical, interlocking water supply systems, each equipped with Fairbanks-Morse pumps for both water supply and sprinkler pressure.

The size and scope of this installation indicate Fairbanks-Morse's ability to supply fire pumps for all magnitudes of industrial and municipal requirements. Whatever your needs in fire protection—big installations or small—your Fairbanks-Morse Field Engineer will be glad to work with your own engineers, in specifying the most efficient equipment. Call him today, or write Fairbanks, Morse & Co., Dept. CP-5, 600 So. Michigan Ave., Chicago 5, Ill.



FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

When inquiring check 3494 opposite last page

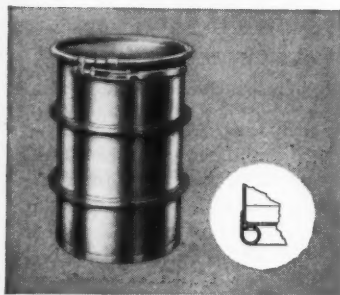
like the chimes
that bring
good news

**Hackney chimes bring
longer profitable lives
to stainless steel drums**

With smooth, crack-free bottoms, reinforced by special welded chimes, Hackney stainless steel drums clean easier, save more on maintenance costs.

Whether storing or shipping foods or other products, corrosion-resistant stainless steel guards against all contamination. Durable yet lightweight, these drums cut shipping and handling costs in a hurry.

Available in 30-, 50- and 55-gallon capacities. Equipped with a single bolt type or a quick-acting Toggle-tite clamp closure to provide a liquid-tight returnable drum.



I-bar hoops eliminated when a straight side container is required. Nickel or Monel drums available upon request.

Special Hackney welded chime is easy to clean, strong and durable.

Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS



When inquiring check 3495 opposite last page

SAFETY



In fire-suit demonstration

... a mock airplane fuselage was saturated with high-octane flight gasoline and aircraft drain oil and set afire. Men wearing aluminized asbestos suits and respirators went directly into the blaze to "rescue" a dummy. Suit proved effective in allowing men to enter intense heat conditions for short length of time.

(Fire suit is manufactured by Wheeler Protective Apparel, Inc., Dept. CP, 224 W. Huron, Chicago, Ill. ... or check 3496 on form opposite last page.)

**Explosion-proof 150w hand lamp
keeps cool in operation ...**

11-lb unit has heat-dissipating fins, is for Class I, Group C and Group D atmospheres

Uses: For safe, practical lighting in explosive atmospheres, such as interiors of fuel tanks during cleaning or painting operations.

Features: Weighing less than 11 lb, fixture is UL-approved for Class I, Group C locations (atmospheres laden with flammable mixtures of



Portable, explosion-proof hand lamp has aluminum body and plastic-coated fiber handle

**SAFE · CONVENIENT
DURABLE · LOW COST**

**BALLYMORE
SAFETY-STEP
LADDERS**

**FROM 1 TO 8
STEPS**



Ladder rolls easily on large rubber ball-bearing casters

Casters retract under user's weight, legs grip floor firmly

Ballymore Safety-Step Ladders are available in a wide variety of sizes and models to meet working-height requirements up to 11'6". They are easily moved on rollers, but with no danger of "kick-out."

Made of all-welded 3/4" steel tubing for maximum strength. Rust-resistant aluminum coating gives a durable, attractive finish. Handrails, optional on 2- through 8-step models, help eliminate fear of accidents. Three treads available: expanded steel, grip steel lath, and rubber-clad steel plate.

Write for specific information to Ballymore Company, West Chester 10, Pa.

**BALLYMORE
LADDERS**



When inquiring check 3497
opposite last page

CHEMICAL PROCESSING

SAFETY

ethylether vapors, ethylene, or cyclopropane) or Group D locations (atmospheres containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer-solvent vapors, or natural gas).

Description: Portable hand lamp uses 150-watt reflector type spot and flood lamps which produce concentrated light pattern. Cone-shaped aluminum body is ridged with heat-dissipating fins. Its plastic-coated fiber handle (balanced for easy carrying) remains cool to the touch even after lamp has been in use for long periods.

Terminal housing, equipped with cord clamp with tapered watertight rubber bushing, encloses three pressure connector terminals. For areas where moisture is prevalent, a special version of the fixture is available equipped with O-ring gaskets at the relamping joint and terminal housing. Lens, an integral part of cover assembly, is not disturbed during replacement of lamp.

(Type EVH70 portable hand lamp is manufactured by Crouse-Hinds Co., Dept. CP, Wolf & 7th North Sts., Syracuse, N.Y. . . . or for more information check 3498 on form opposite last page.)

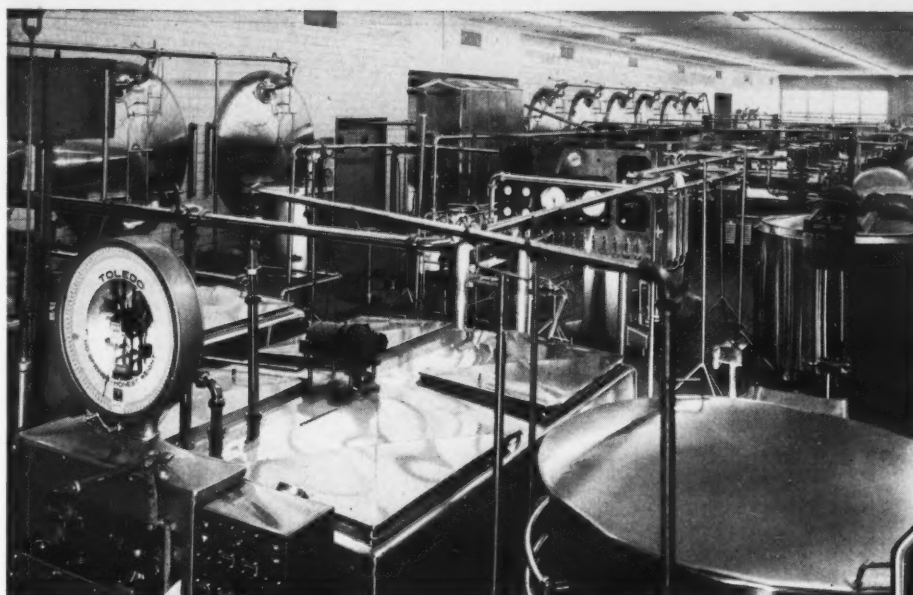
Wall chart lists do's & don't's in handling sulfuric acid

Up-to-date instructions for safe unloading and handling of sulfuric acid are presented in 17 x 22" wall chart. Chart is printed in two colors on moisture-resistant paper. It describes proper methods for pump and air unloading of tank cars, with emphasis on cold weather procedure.

Safety wall chart is issued by Industrial Chemicals Division, Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. When inquiring specify 3499 on form opposite last page.



"Got any olives?"



The Sign of
QUALITY
Motor Control



For maximum safety this large Pittsburgh milk processing plant selected Allen-Bradley combination starters

This modern dairy plant benefits from having A-B combination motor starters with the following safety features:

First Safety Feature—Starter cover can be locked; no unauthorized person can get into the enclosure.

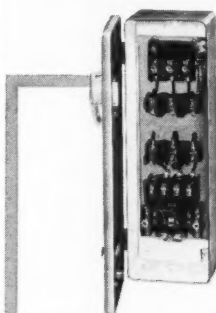
Second Safety Feature—Plant workers are protected, because A-B combination starters can be opened for inspection or fuse replacement ONLY IF HAND LEVER IS IN OFF POSITION. Switch and fuses are then dead and safe to handle, even on wet floors.

Third Safety Feature—Line terminals are covered with a bakelite shield; no screwdriver or other tool can, through carelessness, make contact with these live parts.

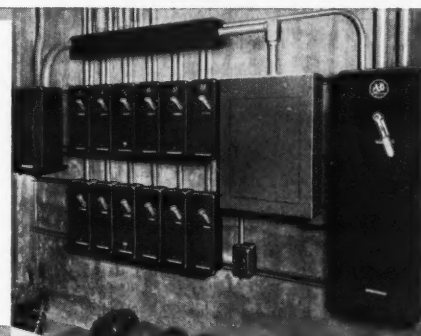
Fourth Safety Feature—Motors are protected from burn-outs. Thermal relays give dependable overload protection. They remain in perfect condition, no matter how long in service.

Bulletin 712 combination starters have manual disconnects; Bulletin 713 starters have I-T-E circuit breakers. Both types take up less room than a magnetic starter and separately enclosed disconnect. Both have A-B solenoid starters, good for millions of operations. Double break, silver alloy contacts eliminate need for regular contact inspection. Specify A-B combination starters.

Allen-Bradley Co.
104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.



Bulletin 712 combination starter with door open to show disconnect switch, fuse clips, and magnetic starter.



Views in control room of Pittsburgh dairy plant, showing lineup of Allen-Bradley Bulletin 712 combination starters.



Bulletin 712 combination starters save space—reduce wiring cost. Bulletin 713 combination starters have circuit breaker.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

When inquiring check 3500 opposite last page

Eleven lines of WALWORTH Saddle Type Wedge Gate Valves

Bronze-Mounted — All-Iron — Ni-Resist
Outside Screw and Yoke — Non-Rising Stem — Quick Opening
Flanged Ends — Screwed Ends



Walworth saddle-type wedge gate valves are manufactured in eleven different combinations of designs and materials, seven of which are illustrated above.

Saddle type wedge gate valves are easy to take apart and are particularly suitable for lines requiring frequent cleaning. Walworth Saddle-Type Wedge Gate Valves are available in a variety of designs including OS & Y; Inside Screw Rising Stem, and Sliding Stem Quick Opening types—in Bronze-Mounted, All-Iron, and Ni-Resist. All types are designed to permit repacking under pressure in either the open or closed position.



FOR COMPLETE INFORMATION, See your local Walworth Distributor or write on business stationery for illustrated circular.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

WALWORTH

60 East 42nd Street, New York 17, New York



SUBSIDIARIES: **ALLOY** ALLOY STEEL PRODUCTS CO. **CONOFLOW** CONOFLOW CORPORATION **GROVE** GROVE VALVE & REGULATOR CO.
SW SOUTHWEST FABRICATING & WELDING CO., INC. **MH** M & H VALVE & FITTINGS CO. **WALWORTH** WALWORTH COMPANY OF CANADA, LTD.

When inquiring check 3501 opposite last page

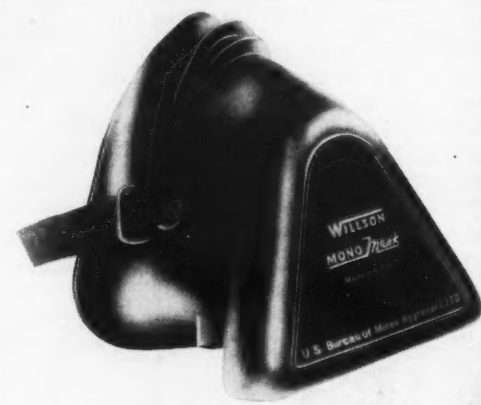
SAFETY

Chromic acid-mist protection? **This respirator gives it . . .**

Bureau of Mines has approved one-piece rubber respirator for this service

Uses: Protection against dusts, pneumoconiosis-producing mists, and chromic acid mist.

Features: Respirator has been approved by Bureau of Mines.



Rubber respirator of one-piece construction has pleated top piece for comfortable wearing

Description: Molded of natural rubber, respirator is of one-piece construction and uses single filter of treated felt. Filter is held in place by nylon retainer which requires no clips or fasteners. Inlet and outlet valves are positive-acting.

(Style 600 MonoMask is manufactured by Willson Products Division, Ray-O-Vac Co., Dept. CP, Reading, Pa. Check 3502 opposite last page.)

Gives quantitative calibration **of halogen leak detectors . . .**

portable instrument emits measured flow of halogen gas to probe of detector

Uses: Calibration of halogen leak detectors — in leak-rate units of ounces of halogen per year.

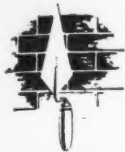
Features: Portable instrument can be used with any number of leak detectors. Unit affords quantitative method of checking halogen leak detectors.

Description: Instrument consists of halogen-vapor and filtered-air systems. These two systems, when combined, provide a halogen leak standard, magnitude of which is observed on leak-rate indicator on instrument's front panel.

Mixed gas escapes through "gun" fitting into which is inserted probe of leak detector. Leak detector can then be calibrated with reading on output indicator.

only **ATLAS** offers...

Plant Wide Protection from Corrosion

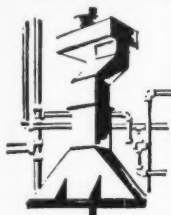


CORROSION-PROOF CEMENTS

Atlas manufactures a complete line of corrosion-proof cements, each designed to do a particular job. The choice involves a thorough study of conditions and materials being handled.

CORROSION-PROOF LININGS

There is an Atlas tank lining to solve your corrosion problem. Atlas linings are based on the highest quality manufactured materials available and are installed at an Atlas plant or in the field.



RIGID PLASTIC STRUCTURES

Corrosion resistant self-supporting plastic structures are designed and fabricated to meet your specific needs... complete plastic pipe systems including flanges, valves, and fittings are also available.



Write for Bulletin CC-3 for complete information on the Atlas line.

When inquiring check 3503 opposite last page

SHOP TIP



For an Easier Way to Remove Packing

Here is a rugged, flexible, hand-tool that "works around corners" for removing old packing from stuffing boxes. The picture above shows how Dura Hooks operate around obstructions. All steel — tempered steel cork-screw bit — made in 6 sizes — nominal in price.

DURA HOOKS

Ask your jobber—or write for DURA HOOK Bulletin No. CDPH covering sizes and prices.



DURAMETALLIC
KALAMAZOO

CORPORATION
MICHIGAN

When inquiring check 3504 opposite last page

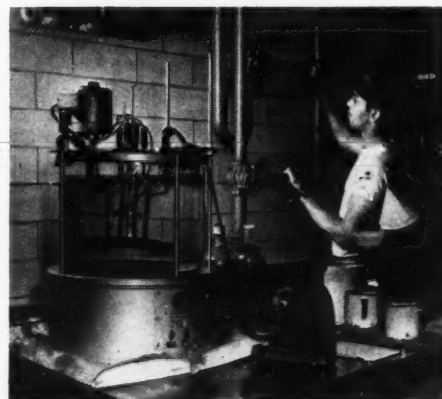
SAFETY



Portable instrument calibrates halogen leak detectors

Device weighs 13 lb net and is 7½" wide, 9" high and 16" deep. It operates on 110-120 volts.

(Halogen leak standard is manufactured by General Electric Co., Dept. CP, Schenectady, N. Y. . . or for more information reader may simply check 3505 on the convenient Reader Service slip which is located opposite last page.)



Lubricated plug valves

... guard against possible explosion at Southern Cotton Oil's Chicago plant by averting hydrogen leakage.

Valves are in 1½" lines between hydrogen main and process tanks. Similar valves (shown) vent hydrogenation tanks. Monthly lubrication assures quick valve action despite temperatures as high as 325°F and pressures to 100 psi.

(Lubricated plug valves are manufactured by Rockwell Manufacturing Company, Dept. CP, 400 North Lexington Avenue, Pittsburgh 8, Pa. . . or check 3506 on form opposite last page.)

NEW WORKLON CATALOG REVEALS BRAND NEW FACTS about ACID RESISTANT WORK CLOTHING

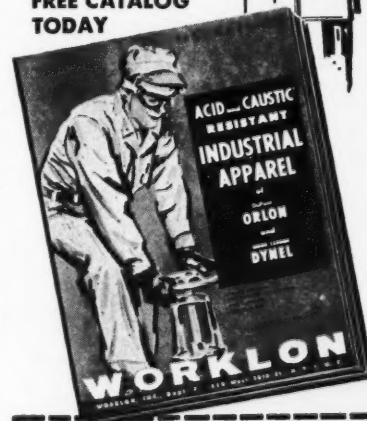
Also featuring LINT-FREE shirts and pants as well as men's and women's lab coats for super-clean conditions.

See how Worklon Industrial Apparel of 100% Orlon and 100% Dynel

- Cuts work clothes costs as much as 93%
- Outwears cotton and wool by 50 to 1
- Durable, comfortable and easy to care for
- Washes easily, dries quickly
- Needs little or no ironing



SEND FOR NEW
FREE CATALOG
TODAY



WORKLON, INC., Dept. CP-57 253 W. 28 St., N.Y.

Gentlemen:

Please send me the new Worklon Catalog FREE!

NAME

ADDRESS

CITY

STATE

WORKLON

253 W. 28 St., N. Y., N. Y.

When inquiring check 3507
opposite last page

Typical AiroViber vibrator installation to keep bulk materials moving.



Low cost AiroViber speeds movement of bulk materials by trouble-free vibration

Operates quietly, effectively in wide range of temperatures; requires no maintenance

Trouble-free—External vibration for effective movement of bulk materials in loading, unloading, moving, packaging, processing, grading or separating is now available to you in the low cost AiroViber vibrator. Simple design of AiroViber involves only one moving part and ends necessity of down time for periodic maintenance or lubrication. It also includes a noise reducing design that eliminates annoyance of sounds often experienced in ordinary types of vibrators.

AiroViber's one-moving-part construction assures you of continual operation in wide range of temperatures. It will also start and operate at all times and is not affected by humidity.



AiroViber's simple design assures trouble-free vibration.

How It Operates

Vibration necessary to keep materials from jamming, arching or hanging up in bins, hoppers, chutes, feeders... is created by the AiroViber vibrator through action of a single heavy steel ball blown by compressed air around a hardened and ground steel track in the housing. A strong centrifugal force developed by the weight of the ball is then transmitted by the vibrator through its mounting into the object being vibrated.

Installation Is Easy

Because of its simplified design, AiroViber may be installed quickly and easily. And, since no upkeep is required, you can install this vibrator in hard-to-get-at locations... fully confident that it will operate for a long time without lubrication or maintenance. Special line oilers or air filters are not needed... merely hook up an air hose large enough to deliver air specified for the unit you select.

Find out how AiroViber vibrators can save you money and time in moving bulk materials. For illustrated literature and address of nearest distributor, write Viber Company, 726 South Flower St., Burbank, Calif., Dept. 19-G-5.

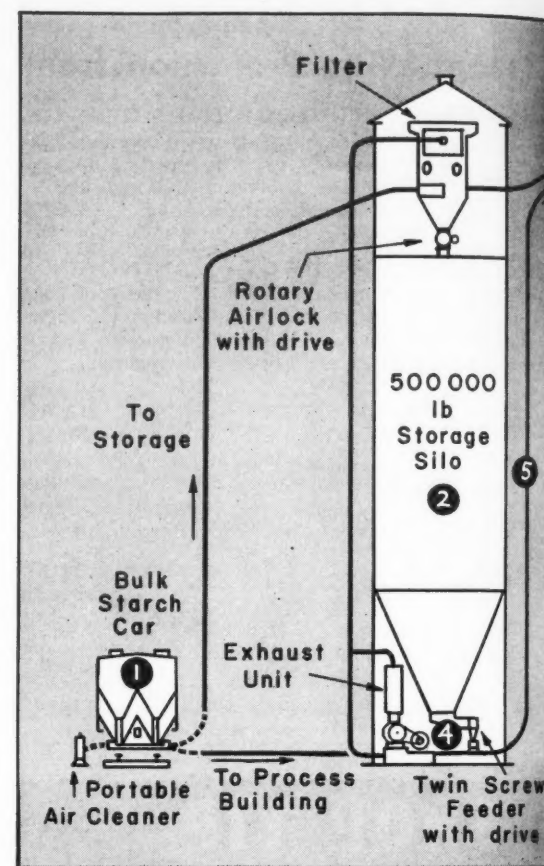


VIBRATORS SINCE 1931

When inquiring check 3508 opposite last page

material handling

Pneumatic conveying system is set up to unload Airslide car (1) and send raw starch material to either storage silo (2) or bins on sixth floor processing department (3). Material is transferred from silo to process bins through valve at silo bottom (4) and duct (5) to receiver on roof (6).



It took eight men two hours at Faultless Starch to unload 50 tons of starch in 100-lb bags from freight cars. A pneumatic conveying system was installed, and now, from an Airslide* car...

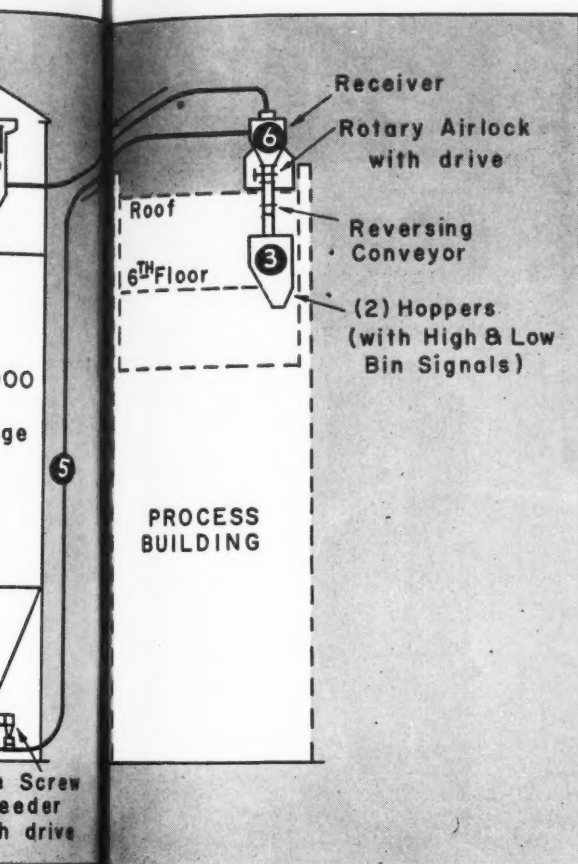
one man can unload 50 tons of starch in two hours

Problem: Raw corn starch was shipped to the Faultless Starch Co. plant, Kansas City, Mo., in 100- and 140-lb bags. The bags were taken out of freight cars, loaded on hand trucks, and taken to storage or to the sixth-floor processing department. Unloading 50 tons took eight men two hours.

*Trademark of Fuller Co.

With this type of operation, there was always bag breakage and loss of material. Besides loss of money, spillage of material also meant extra housekeeping.

Any idea of handling the material in bulk also presented a problem. With mechanical means of transferring the raw starch, could they be sure of keeping the material clean? Any dust, dirt or grease picked up



Silo allows large amount of material to be held in storage prior to use

adulterates end-product which is packaged laundry starch . . . and contaminates process equipment which eventually requires downtime for cleaning.

Solution: Thinking in terms of bulk handling, Faultless Starch looked into pneumatic conveying systems. With innovation of the Airslide car (a specially designed freight car for pneumatically unloading bulk solid materials) they started a comprehensive study into the economics and mechanics of the system versus handling bagged materials. Test results were favorable and proceedings on installing a pneumatic system were started. At the same time, the wet corn millers, suppliers of the starch, and the railroads agreed to lease the cars.

System installed is set up for unloading raw starch from cars directly to storage silo, or two process bins, and for transferring from storage silo to the process bins. Control of operation is from central push-

button panel.

When car has been spotted at the siding, operator connects car's nozzle to conveying duct. He then attaches hose from blower which furnishes air to fluidize the pulverized raw starch.

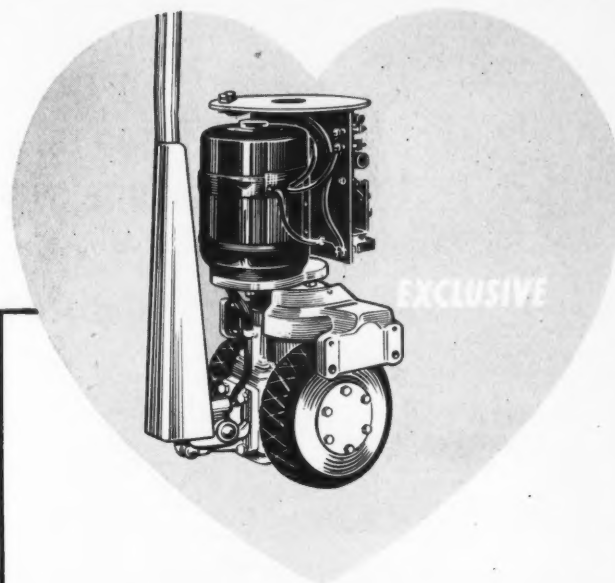
Material to storage is drawn through the duct to filter located in top of silo. There it separates from the air and drops by gravity through rotary airlock into the silo. Filter is divided into four compartments, one of which is cut out of service every two minutes for cleaning the cloth filter tubes. When valve for any compartment is closed, shaker motor is activated and cloth filter tubes are shaken continuously for 15 seconds. Air is removed from filter by exhaustor located in base of silo. Separation is such that there is 100 percent retention of visible dust.

Material going to process bins is fed into receiver on roof above bins. Here it is

(Please turn to next page)

STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

Hydro^{Electric} LIFT TRUCKS



HEART OF THE Hydro^{Electric} THE DYNA-DUAL POWER UNIT

This sturdy Dyna-Dual Power Unit out performs all others for ease of operation—dependability—lowest maintenance cost and economy of power. HydroElectrics will keep rolling and moving your materials at lower costs than any truck in its class. Want proof? Complete facts and data on request.

Note: The Dyna-Dual Power Unit is interchangeable on all models.



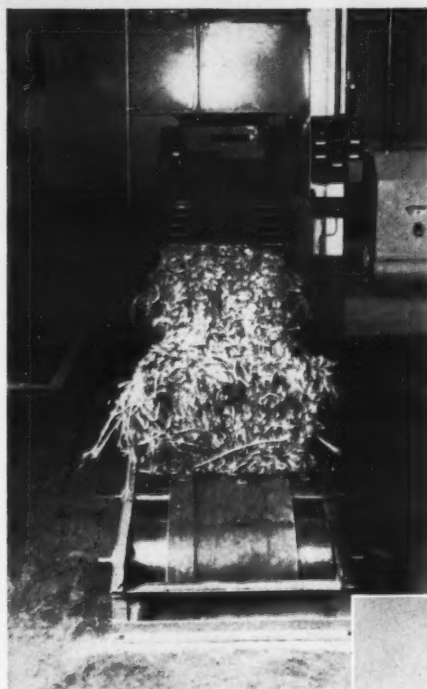
LIFT TRUCKS
INCORPORATED

2423-31 SPRING GROVE AVE.
CINCINNATI 14, OHIO



THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

When inquiring check 3509 opposite last page



TAYLOR-STILES BALE BREAKER OPENS A 500 LB. BALE OF JUTE CUTTINGS IN 5 TO 8 SECONDS!

User states, "Our Taylor-Stiles Bale Breaker takes 20 seconds between starting the feed belt of the pusher unit, and return to starting point. It takes 5 to 8 seconds to actually consume the bale."

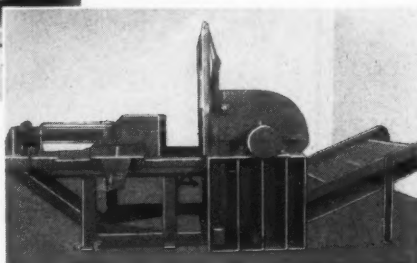
"One operator not only operates the bale breaker, but also fetches the bales from storage (5 to 10 yards distance), cuts the ropes of the bales, places the bales on the feed conveyor, and starts the feed conveyor."

"Apart from the saving in labour and other indirect savings," says the user, "probably the most important aspect of this installation is that it has turned an inhuman operation, where men were opening jute bales with sledge hammers, into a push-button job."

Whether you are interested in opening bales of jute cuttings, sisal, rags, bagasse, cotton linters, straw, or similar products you too will find a Taylor-Stiles Bale Breaker will save you time and money.



SEND FOR A FOLDER ILLUSTRATING AND DESCRIBING TAYLOR-STILES LONG AND SHORT FIBRE BALE BREAKERS.



**TAYLOR, STILES
& COMPANY**
20 BRIDGE STREET
RIEGELSVILLE, NEW JERSEY

When inquiring check 3510 opposite last page

MATERIAL HANDLING

Starch Conveying

(Continued from preceding page)



Material going to process bins is separated from air in receiver mounted on roof above bins. Material goes by screw conveyor into bins. When one bin is full, conveyor reverses to fill the other

separated from the air (air goes on to filter in silo), falls through airlock valve, and is delivered to bins by a reversing screw conveyor. When one bin is full, conveyor reverses to fill the other.

Both silo and bins have high-level indicators which flash a red light on control panel and sound warning horn. When the material rises above paddle of indicator, light flashes, warning sounds, and operator at car closes gate to stop flow of material immediately.

Other than connecting the car into system, all operation is automatic. Setting switches and pressing buttons on control panel engages proper valves and other pieces of equipment for particular desired unloading or transferring operation.

Results: Using the system, one man can unload 50 tons of starch in two hours. This has released the extra men for other duties around the plant. There is no loss of material either through spillage or by contamination. In addition to saving on handling costs at the plant, there has been a reduction in actual cost of raw material, since suppliers have saved expense of packaging and shipping in bags. Moreover, a large amount can now be held in storage prior to use.

Faultless Starch feels that savings in cost of raw material and handling charges will pay for the installation in two or three years.

(Pneumatic conveying equipment was engineered and furnished by Fuller Co., subsidiary of General American Transportation Corp., Dept. CP, Catauqua, Pa. Check 3511 opposite last page.)

(Airslide car was manufactured by Trans-Flo and Airslide Car Division, General American Transportation Corp., Dept. CP, 135 S. LaSalle St., Chicago 90, Ill. . . . or for more information check 3512 on form opposite last page.)

BASIC FACTS

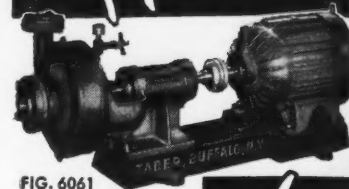


FIG. 6061

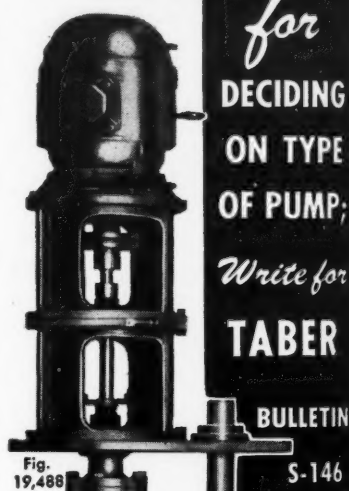


Fig. 19,488

for
DECIDING
ON TYPE
OF PUMP;
Write for
TABER

BULLETIN

S-146

**Practical
GUIDE TO
PUMP
SELECTION**

Big illustrations and brief descriptions with capacities and adaptability of pumps are contained in this unbiased compilation of facts to help avoid costly misapplication. Bulletin S-146.

TABER PUMP CO.
Est. 1859
320 Elm St.,
Buffalo 3,
N. Y.

TABER

When inquiring check 3513 opposite last page

CHEMICAL PROCESSING

MATERIAL HANDLING

**Hand truck is motorized —
reduces operator's effort in
handling heavy loads . . .**

motor powers both wheels
to facilitate movement

Uses: Loading, unloading, and
short-range moving of objects up
to 1000 lb.

Features: "Motorizing" the
hand truck reduces amount of
manual effort required to move
heavy loads.



Motorized hand truck facilitates
handling of loads to 1000 lb

Description: Motorized hand
truck has three speeds forward
(up to 4 mph) and one for re-
verse. It is equipped with heavy-
duty transmission and powered
by 2-hp gas engine mounted on
welded, tubular steel frame. En-
gine has double positive clutch
and finger tip safety brake con-
trol. Both wheels are powered
and have oversize pneumatic
tires. Manual snap-lock holds
load securely in place. Compact
unit has gross weight of 275 lb,
is balanced for handling ease.

("E-Z Loader" is product of
Walco Supply Co., Dept. CP, PO
Box 652, Glendora, Calif. . . . or
check 3514 opposite last page.)

For more information on prod-
uct at right, specify 3515 . . .
see information request blank
opposite last page.



new PAYLOADER®
does the work of 3 tractor-shovels

Planters Fertilizer & Phosphate Company, Charleston, S.C.
has discovered a faster, better and more economical way to
dig and move superphosphate from the curing sheds. Their
discovery is the new model HAH "PAYLOADER", and here
is Plant Manager A. C. Palmer's enthusiastic report on how
it is working out:

*"The HAH moves 250 to 300 tons per 8 hours operation
that previously took three smaller tractor-shovels. The
terrific break-out bucket action and larger payload (1 cu. yd.)
makes the difference. The HAH 'PAYLOADER' has proven
itself to the point that we are now planning plant changes
for additional HAH material handling operations."*

Owners *expect* more from a "PAYLOADER" tractor-shovel
and they *get* more because they are the result of 35 years of
tractor-shovel pioneering and because more of them are in
service than all other makes combined.

**Why does the new HAH
PAYLOADER® dig,
carry and deliver more?**

Big Capacity (1 cu. yd. payload)

Exclusive 45° bucket roll-back at ground

Exclusive hydraulic load-shock-absorber

Exclusive power-transfer differential

Powerful break-out digging action

Power-steer and hydraulic brakes

THE FRANK G. HOUGH CO.

744 Sunnyside Ave., Libertyville, Ill.

Send full data on "PAYLOADER"
tractor-shovels as follows:

- ☐ Model HAH (1 cu. yd.)
- ☐ Model HA (18 cu. ft.)
- ☐ Larger models to 2 1/4 cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

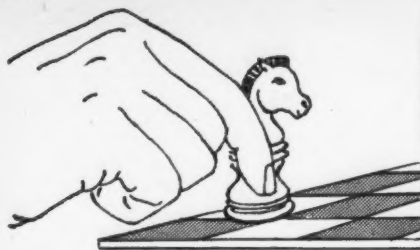
75



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY





GAS STORAGE *Is your move* with TAYLOR-WHARTON GAS TRANSPORTS

TAYLOR-WHARTON Gas Transports provide mobility of gas storage for users of bulk compressed gases. Economy and flexibility of operations make these transports preferable to permanent bulk storage for many oil refining, petrochemical, food and electronic companies, especially where interplant haulage and standby needs are important.

Each transport contains a group of seamless steel storage pressure tubes made to ICC-3A2400 specifications. Rigidly mounted to a standard semi-trailer chassis, the tubes are valved and manifolded together to a common outlet in a rear-mounted weatherproof cabinet. Standard capacities from 38,500 cu. ft. to 56,250 cu. ft. Other sizes as required.

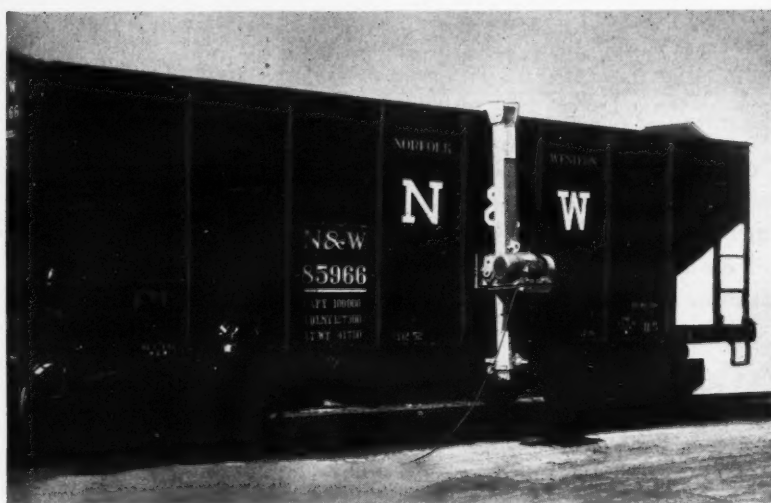
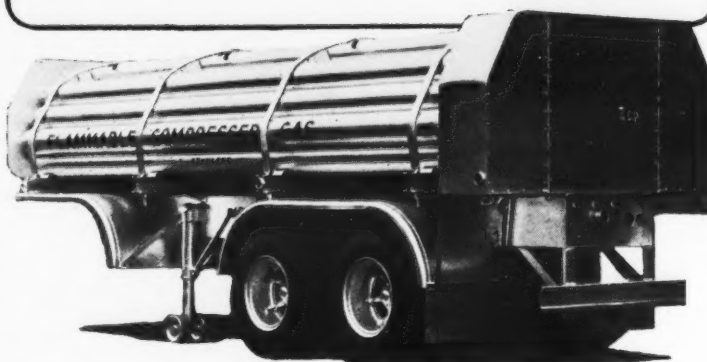


Send for further information, mentioning type of gas and storage requirements

TAYLOR-WHARTON CO.
Division of HARSCO CORPORATION

**Harrisburg 24,
Pennsylvania**

When inquiring check 3516 opposite last page



The NATIONAL CAR SHAKER

was developed to meet a demand for a low cost means of unloading material from hopper bottom cars. It will cut your labor costs up to 80%, keep your men out of railroad cars, and speed up your unloading operations.

NATIONAL CONVEYOR & SUPPLY COMPANY
357 N. Harding Ave., Chicago 24, Ill.

When inquiring check 3517 opposite last page

UNLOAD

Coal, Coke, Sulfur,
Ores, Sand, Stone,
Limestone, Cinders,
And Other Bulk
Materials.

WRITE TODAY

MATERIAL HANDLING

Improved dust protection featured on lift truck . . .

harmful effects of abrasive dust and lint greatly reduced with protective plate and filters

Uses: Designed to reduce maintenance on material handling equipment used in locations containing atmospheric abrasives.

Features: Harmful effects of abrasive dusts and lint to mechanical and electrical parts are materially reduced.

Description: Tandem air cleaning system filters air entering carburetor. Air passes through dry type precleaner first, then through heavy-duty oil bath cleaner. Precleaner is mounted on truck hood so that primary engine air intake is remote from contaminated air from engine fan. Heavy-duty air filter is provided on crankcase breather pipe.

Bottom of truck is protected by deflector plate which can be easily removed for truck servicing. Generator and voltage regulator are completely enclosed.

(Dust-protected lift truck is product of Yale & Towne Mfg. Co., Dept. CP, 11,000 Roosevelt Blvd., Philadelphia 15, Pa. . . . or for more information check 3518 on form opposite last page.)



. . . and that, gentlemen, happens to be my lunch!!"

Thanks to James C. Reilley, E. I. DuPont DeNemours and Company, Inc., Wilmington, Delaware

CHEMICAL PROCESSING

Flattens heavy-bottom bags so that they will stack better . . .

vibrating machine handles fragile materials without product breakdown or bag damage

Uses: Flattening heavy-bottom bags of loose, bulk material so that they can be stacked uniformly. Materials now being handled include pelletized fertilizer, carbon black pellets, plastic powders, polyethylene and neoprene cubes, flake caustic, and charcoal briquets.

Features: Gentle action of rather uncomplicated machine makes it adaptable to fragile materials since no product breakdown occurs. Bag damage is nil.



Bag flattener's operation is seen by the difference in bag shape at feed (left) and discharge ends

Description: Apparatus gently tosses bags upward and forward with each movement of the trough. Flattening is achieved almost immediately because material inside bag conveys more quickly than the bag itself.

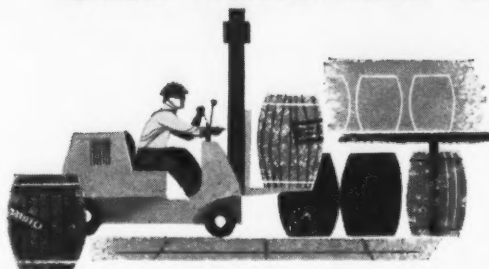
(Vibrating bag flattener is manufactured by Carrier Conveyor Corp., Dept. CP, 198 N. Jackson St., Louisville, Ky. . . or for more information check 3519 on form opposite last page.)

Dictionary of conveyor terms approved as standard guide

Dictionary of 64 pages covering conveyor terms and definitions has been approved as standard guide by American Standards Association. Defining nearly 1500 conveyor and conveyor equipment terms, and containing approximately 100 line drawings, the guide has been placed in American Standards Association libraries throughout the world.

To obtain copy of "Conveyor Terms and Definitions" (American Standard "B-75") remit \$1.00 direct to Conveyor Equipment Manufacturers Association, Dept. CP, One Thomas Circle, Washington 5, D.C.

Q. How can you eliminate these high-cost bulk materials handling methods?



A. Mechanize the job completely with A. O. Smith Permaglas® Storage Units.

WHATEVER your bulk materials storage and handling problems, it will pay you to investigate A. O. Smith Permaglas Storage Units. A modern materials handling system incorporating these units lets you store more in less space . . . at lower cost.

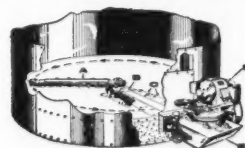
• **Greater overall efficiency** — Incoming materials are conveyed directly into the Permaglas Storage Unit. Exclusive sweep-arm bottom unloader automatically discharges bulk materials into your apportioning system — by the batch or in continuous process.

• **Reduced materials handling costs** — Permaglas Storage Unit is designed for maximum filling. Permits economical bulk-lot materials purchasing. Eliminates costly man-handling of incoming packages as well as in-plant trucking.

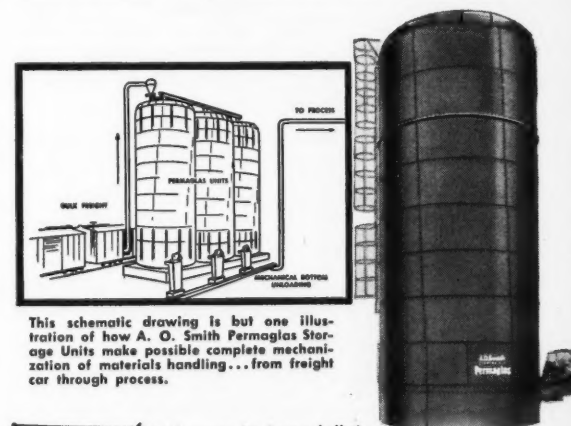
• **Maximum use of space** — Variety of heights and diameters available in Permaglas Storage Units assures maxi-

mum use of storage space in existing locations or new facilities.

• **Minimum maintenance costs** — Permaglas Storage Units are glass-protected steel, inside and out. No internal corrosion from stored materials. No expensive exterior maintenance as with conventional structures.



OPERATING PRINCIPLE OF A. O. SMITH SWEEP-ARM BOTTOM UNLOADER. As unloading arm (A) moves counter-clockwise, endless chain on arm moves the material to the center where it drops into sub-floor conveyor trough (B) for removal at discharge opening (E). Two steel plates (C) cover chain conveyor. Entire mechanism is powered by electric motor (D).



This schematic drawing is but one illustration of how A. O. Smith Permaglas Storage Units make possible complete mechanization of materials handling . . . from freight car through process.

Through research  . . . a better way

A.O. Smith
CORPORATION

HARVESTORE PRODUCTS
Kankakee, Illinois

Distributor: SPROUT-WALDRON
Muncy, Pennsylvania



Mail coupon for 6-page bulletin on Permaglas Storage Units with mechanized bottom unloader.

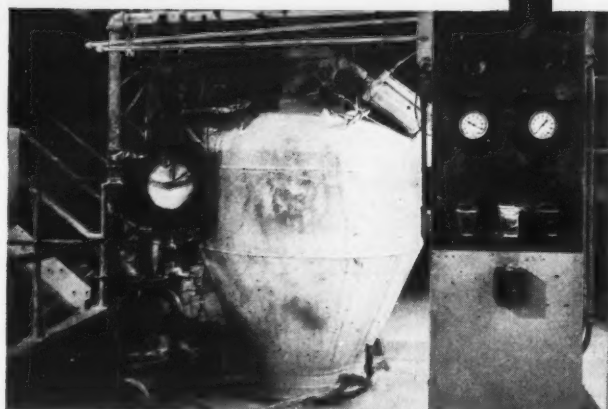
A. O. SMITH CORPORATION
Harvestore Products, Kankakee, Ill., Dept. CP-57

Please send me more information and technical data about Permaglas Mechanized Storage Units.

Name.....
Firm.....
Address.....
City..... Zone..... State..... MU-2334

When inquiring check 3520 opposite last page

Difficult Bulk Handling Job



...but well-handled by the **Robinson** *Air Activated* **Conveyor**

Product ... abrasive chemical, 1/4" to fine dust
Temperature ... 600° F.

This Robinson Air-Activated Conveyor is installed in the plant of a well-known chemical company where it is conveying the hot chemical noted above ... a job on which other means of handling, including pneumatic, either failed or proved inadequate.

Robinson operations can be made fully automatic and closely controlled by precise instrumentation.

The Robinson System—completely pneumatic, with gravity feed—offers several outstanding advantages for handling fine granular or dry powdered materials into, through and from the plant.

- 1 ... products are handled gently; the mixture is 'fluidized'; particles are floated rather than blasted through the conveyor.
- 2 ... only low volume of air is required; the average is less than 1 cubic foot of free air per pound of material conveyed.
- 3 ... maintenance costs are exceptionally low; no moving parts such as motors, screws, shafts and bearings to require maintenance.

The Robinson Air-Activated Conveyor may be just what you need for pneumatically handling the materials at your plant. Investigate its possibilities. We can point to many successful installations. Write us in detail about your problem.

ROBINSON

Air Activated

A Division of
Morse Boulder Destructor Co.

CONVEYOR SYSTEMS

DEPARTMENT T, 80 FIFTH AVENUE • NEW YORK 11, N. Y.
Representatives in Principal Cities

When inquiring check 3521 opposite last page

MATERIAL HANDLING

Details handling equipment — fork trucks, tractors

Construction and special operating features of material handling equipment, including fork trucks, towing tractors, and platform trucks, are detailed in 20-page bulletin. Dimensions and specifications are provided through tables and drawings. Lists show capacities and all models and attachments are illustrated.

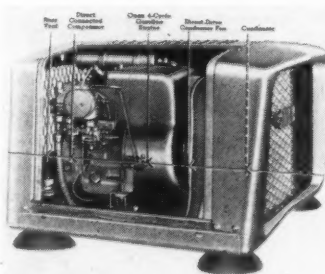
Bul 305 is issued by Buda Division, Allis-Chalmers Mfg. Co., Dept. CP, Milwaukee 1, Wis. When inquiring specify 3522 opposite last page.

Air conditioning unit is designed for truck cabs ...

self-contained, self-powered unit mounted on cab roof

Uses: Designed for cooling, dehumidifying and circulating air in driver's compartment of truck, unit can be used with cranes, power shovels and in interiors of panel trucks and display vans.

Features: Mounts easily on roof of truck cab. Self-contained except for fuel pump, fuel supply



Condenser, compressor and engine are within air conditioner

and starting batteries, it has gasoline- or propane-driven engine. In case of gasoline-driven trucks, fuel comes from truck's fuel tanks.

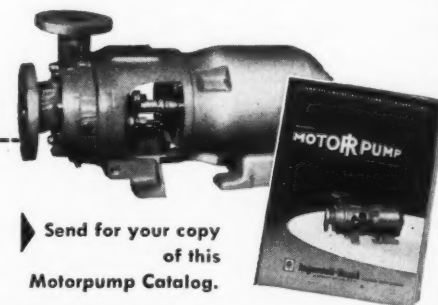
Description: Air housing projects through roof of cab and provides two cold-air inlets with

when you have a liquid-moving problem

Ingersoll-Rand's Motorpump is designed to provide maximum performance in all types of installations. Compact design makes installation easy; balanced, precision construction assures peak performance, smooth operation. From 1/4 to 75 hp ... 5 to 2800 gpm ... to 650 feet head.

Ingersoll-Rand

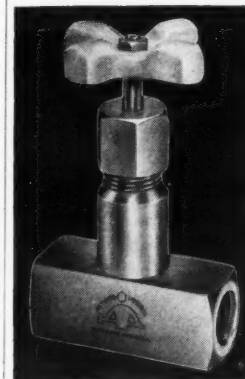
11 Broadway, New York 4, N.Y.



Send for your copy
of this
Motorpump Catalog.

9-499

When inquiring check 3523 opposite last page

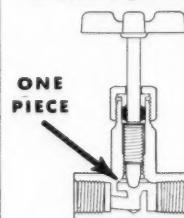


MARSH
Needle Valves

MAXIMUM
WORKING PRESSURE
10,000 PSI

... for finer regulation of water, oil or gas

First needle valve to combine all the characteristics called for in modern industry. Embodies sturdiest basic construction—machined from solid bar stock—suitable for pressures to 10,000 psi and equally efficient in lower range. Note



stem guide fused to body by new "Conoweld" process, eliminating faults of conventional two-piece valves. Stem 416 stainless steel. Stem threads fine pitch for strength and micrometer regulation. Body electro-zinc plated. Sizes 1/8" to 1", globe and angle patterns.

Ask for new Needle Valve Catalog

MARSH INSTRUMENT CO. Sales Affiliate of Jas. P. Marsh Corp. Dpt. Z, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd Street, Edmonton, Alberta, Canada

When inquiring check 3524 opposite last page

CHEMICAL PROCESSING



NEW! Uniform Pipe Identification System

Makes it easy and economical to standardize pipe marking

Free Planning Kit

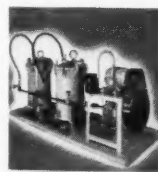
- Shows you how and where to mark utility, process, and supply lines.
- Shows you how to estimate costs.
- Tells you how to write specifications.
- Simplified check list figures your marking needs.
- You can compare actual costs for painting and stenciling vs. the Brady System.
- Planning Schedule helps install marking system fast at lowest cost.
- You get working samples for testing.

If marking pipes is your responsibility, write for this valuable Planning Kit on your letterhead today.

W. H. Brady Co., 756 W. Glendale Ave., Milwaukee 9, Wis.

When inquiring check 3525 opposite last page

Whatever You Need Vacuum For



Vacuum Impregnating



Vacuum Processing



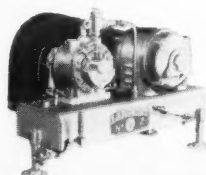
Vacuum Packaging

You Can Get It For Less With a LAMMERT PUMP

Capacities from 4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).



Write for catalog giving specifications of Lammert Vacuum pumps and compressors.



LAMMERT & MANN CO., INC.

1793 Walnut Street, Chicago 12, Illinois, SEley 3-0383

When inquiring check 3526 opposite last page

MAY 1957

MATERIAL HANDLING

directional deflectors and return air duct. Controls are located inside cab on the housing.

Dimensions of unit are 29" long, 29" wide, and 19" high. Unit weighs 225 lb.

("Kab Kooler" is manufactured by D. W. Onan & Sons Inc., Dept. CP, Minneapolis 14, Minn. . . . or for more information reader may simply check 3527 on Reader Service slip which is located opposite last page.)

Tractor-mounted loader has non-spring bucket

Uses: Unit mounts on front end of tractor for loading or unloading heavy bulk materials.

Features: Loader has especially strong "pry-out" action for heavy or frozen loads. Bucket rams are mounted so that they cannot spring.



Adaptable to most models of industrial tractors, loader has extra-strong tubular frame

Description: Hydraulic piping is enclosed in loader arms for protection. Part of tubular frame acts as hydraulic oil reservoir. Loaders can be mounted on most models of low-silhouette, four-wheel industrial tractors.

(Loader for tractor is manufactured by Superior Equipment Div., Superior Pipe Specialties Co., Dept. CP, PO Box 341, Wheeling, Ill. . . . or for more information check 3528 on form opposite last page.)

Rotary AIRLOCK FEEDERS

for practically EVERY process requirement

STANDARD DUTY



For low pressure dust control systems where the pressure differential ranges from 0 to 12" w.g. Available in 6", 8" and 10" sizes—cast iron construction and rotors equipped with renewable wiper strips; with or without drives.

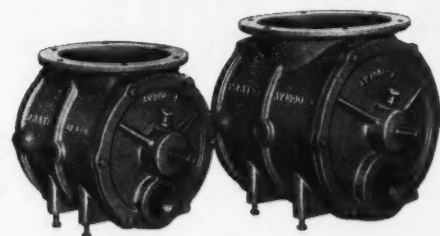


HEAVY DUTY

For higher pressure dust control or pneumatic conveying systems where pressures may range up to 5 to 10 psi. Features life time lubricated sealed ball bearings and special shaft seals for heavy, continuous service. Built in 6", 8", 10" and 12" sizes; with or without drives.

BLOW-THRU

Ideal for feeding flour or any similar product into pneumatic conveying lines, against pressures up to 15 psi. Built in 8" and 10" sizes serving 2" and 3" conveying lines respectively. Available with or without drives.



Bulletin P-55 contains complete specifications and data—sent promptly upon request.

PRATER

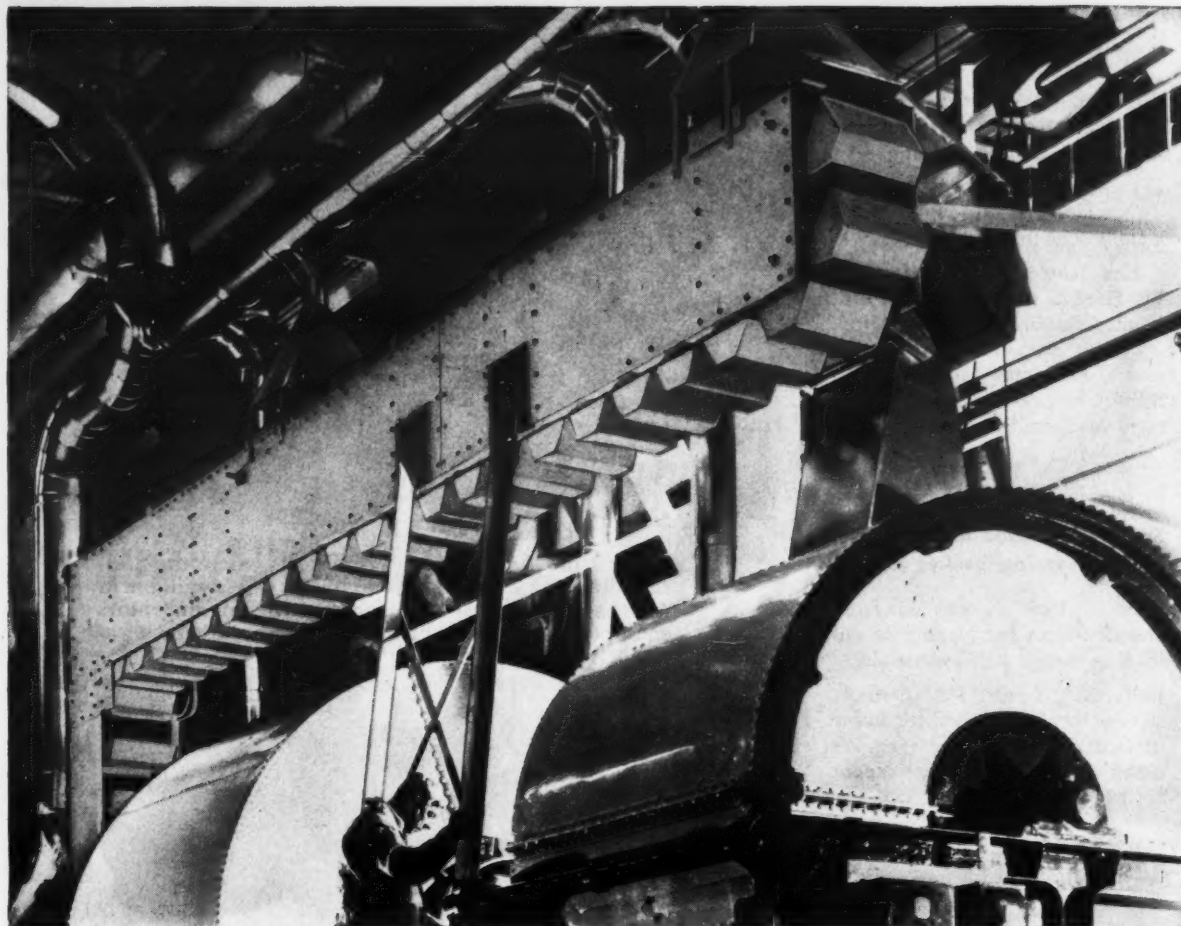
Foremost Builder of Rotary Airlocks

PRATER PULVERIZER COMPANY

1513 SO. 55th COURT • CHICAGO 50, ILL.



When inquiring check 3529 opposite last page

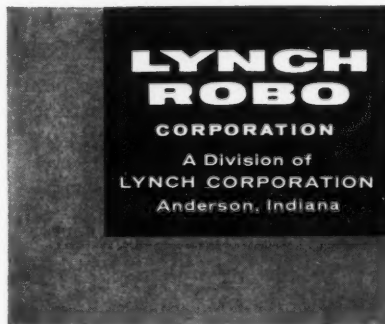


BUCKET LIFT CONVEYING FOR ANY BULK FEEDING OPERATION

Robo-Lift moves any bulk material horizontally and vertically...gently and without costly rehandling. Gentle filling-without-scooping makes Robo-Lift suited for handling foods, drugs, compounds, powdered metals and components. Each installation is custom designed for integration with existing production and packaging machinery. In photo above, Robo-Lift carries dry tea. One man controls discharge of tea into both blenders to bring new speed and economy to this batch operation. Our new folder describes the advantages of Robo-Lift. Write today for your copy of "Up...and Over!"

Address Inquiry to Dept. B

ROBO-LIFT BUCKET ELEVATING CONVEYORS



When inquiring check 3530 opposite last page

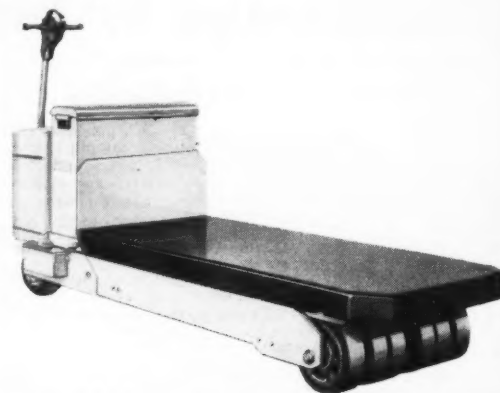
MATERIAL HANDLING

Heavy-duty platform truck handles loads up to 20,000 lb . . .

motorized hand truck is driven by two dual-drive units; have 3 1/2" lift

Uses: For handling palletized loads in plant areas and on smooth surfaces.

Features: Twin-drive model can handle loads up to 10 tons.



Motorized hand platform truck is designed for heavy duty

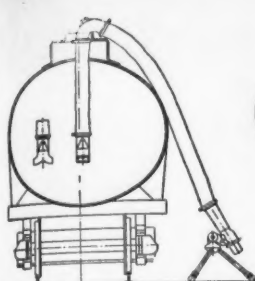
Description: With minimum widths of 27" and lengths of 48" and up, platforms are available in lowered heights of 9, 10, and 11". Lift of 3 1/2" is by either dual or quad lift cylinders activated by extra-heavy duty pump motor unit.

(Heavy duty Model K Hydroelectric lift truck is manufactured by Lift Trucks, Inc., Dept. CP, 2425 Spring Grove Ave., Cincinnati 14, Ohio . . . or for more information about manufacturer's product reader may simply check 3531 on the convenient Reader Service slip which is located opposite last page.)

Minimum handling, storing of pallets with loader-unloader

Automatic pallet loader-unloader equipment for stacking or unloading cartons, bottles, boxes, or barrels is depicted in eight-page bulletin. Equipment is reported to provide savings through minimum handling and storing of pallets. Operating, engineering, and construction information is contained.

"Pallet Loader-unloader" is issued by Materials Handling Section, Food Machinery and Chemical Corp., Dept. CP, Riverside, Calif. When inquiring about manufacturer's product reader may simply specify 3532 on form which is located opposite last page.



TANK CAR is easily freed of fumes for workers' safety.

KEEP AIR FRESH

in confined places with COPPUS

Design "A" Ventilator

Improve workers' safety—health—comfort—efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 385 Park Ave., Worcester 2, Mass. Sales Offices in Thomas' Register.

Other "Blue Ribbon" Products in Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory and Mining Catalogs.

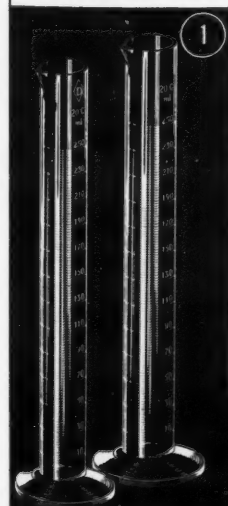


CHEMICAL STILL is here ventilated while being repaired.



When inquiring check 3533 opposite last page

make sure... make the "two-way" test



Make sure that you get the highest quality laboratory glassware for the lowest possible price by making the "TWO-WAY" Test. TO MAKE THE "TWO-WAY" TEST!

STEP 1. Obtain samples of several advertised brands of laboratory glassware. Be sure to include a piece of Doerr Diamond D Blue Line. Devise the most rigid tests you can think of and evaluate each brand on the basis of these tests. Tabulate the results.

STEP 2. Now, compare the prices. You will find that the Doerr Diamond D Blue Line is your best buy—offering the highest quality for the lowest possible price.

Ask your dealer about the Diamond D Blue Line or send for more detailed information today.



DOERR GLASS COMPANY
Vineland, N. J.

When inquiring check 3534 opposite last page

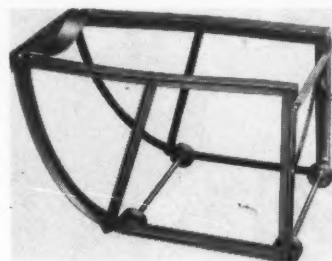
MATERIAL HANDLING

Cradle-truck carries drums, barrels easily, safely . . .

curved top rails of truck prevent barrel tipping

Uses: For moving loaded barrels or drums.

Features: Curved top rails hold barrel firmly in position to



Non-skid devices and safety-catch prevent barrel from sliding during loading

prevent tipping. Non-skid devices are located directly forward of front wheels, and nose piece has safety catch.

Description Barrel cradle truck has 18" wheel base. It is available with four large 3"-diameter wheels placed on straight axle. Height to bung of barrel is 22".

(Barrel cradle truck 49 is product of Morse Mfg. Co., Inc., Dept. CP, 727 W. Manlius St., East Syracuse, N.Y. . . . or for more information check 3535 on form opposite last page.)

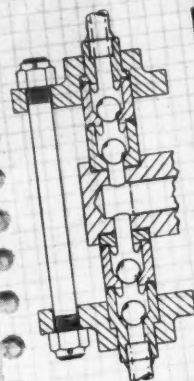
Discusses lift truck design for low-clearance work

Specifications and drawings for "low profile" fork lift truck are contained in four-page bulletin. Special design features for operation where low overhead-clearance is a problem are discussed. Photograph identifying and describing truck's parts is included.

Bul 6011A is issued by Automatic Transportation Co., Dept. CP, 101 W. 87th St., Chicago 20, Ill. When inquiring specify 3536 on form opposite last page.

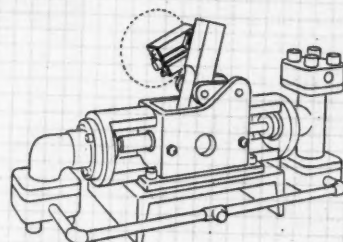
advanced design in high pressure pumps

High Pressure Valves--



of ball-guiding cone seat type. (Under high pressure conditions, balls do not seat themselves properly on conventional ring type seats, without guides.) Pressure drop is in direct ratio to ball rise (patent applied for). Valve illustrated is an easily disassembled design for pressures to 3,000 psi. Other valves, totally enclosed in forged steel, for pressures to 35,000 psi. Balls may be spring-loaded for down stream pumping and viscous materials (up to 30,000 SSU).

Differential Pressure Heads--



cut pump power requirements to a fraction by utilizing high suction pressures, when available.

These heads hydraulically balance the pistons using suction pressure. Thus, it is only necessary to power the pump for the difference between available gallon-pounds of

suction and required gallon-pounds of discharge. Example: to add 5 gph of nitric acid at 5000 psig to 4500 psig liquid isotope—power requirement without differential pressure head is 2 hp., with differential pressure head it is only .5 hp., or a saving of 1.5 hp.

For other advanced design features . . .

Write for Bulletin HP-1254

PHILADELPHIA PUMP & MACHINERY COMPANY

13500 Philmont Avenue, Philadelphia 16, Pa.

SUBSIDIARY, AMERICAN METER COMPANY

**PHILADELPHIA SERIES HP
HIGH PRESSURE PUMPS**

When inquiring check 3537 opposite last page

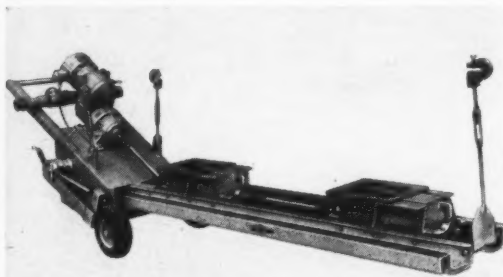
MATERIAL HANDLING

Attaches to Airslide cars for unloading material to trucks or bins . . .

pneumatic unloader is mobile and has variable-speed drive for feed-rate adjustment

Uses: Mobile unloader attaches to Airslide-car outlet and conveys materials such as clay, urea, phenolic molding compounds, and synthetic resins to bins or trucks.

Features: Machine has variable-speed drive which makes possible mechanical adjustment of



Mobile unloader has aluminum frame, can be handled by two men

feed rate, insuring constant flow. Each wheel is independently adjustable, allowing alignment of blow-through feeder flanges with those of car's outlet.

Description: Positive clamp and turnbuckle arrangement is used to attach whole assembly to frame of car. Valves for regulation of air to car are contained on the unit.

Complete assembly is mounted on aluminum frame; balance is over wheels. Weighing 1045 lb, it can be handled by two men.

(Portaflow unloader is manufactured by Sprout, Waldron and Co., Dept. CP, Muncy, Pa. . . . or check 3538 opposite last page.)

Reading and recording weights from long distances is job of load-cell scale . . .

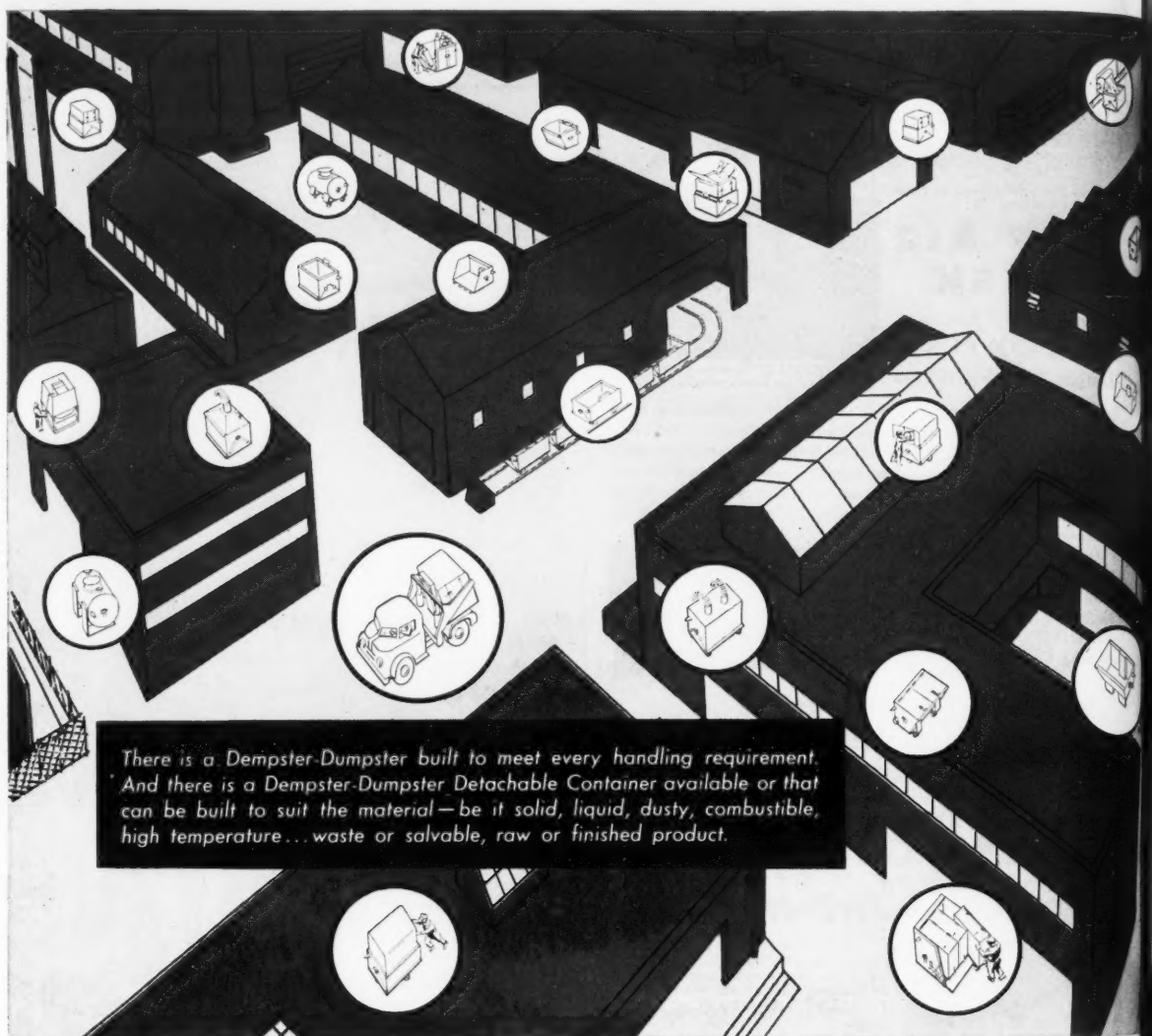
electronic operation, results in high-speed dial indication, transmission of digital signals

Uses: Remote indicating and recording of weights.

Features: Scale offers benefits of electronic instrumentation in combination with accuracy of load cells: high-speed indication, remote reading, connection with digitizing equipment.

Description: Scale basically consists of load cells with platform or load suspension unit, and

Who else wants to reduce materials



There is a Dempster-Dumpster built to meet every handling requirement. And there is a Dempster-Dumpster Detachable Container available or that can be built to suit the material—be it solid, liquid, dusty, combustible, high temperature...waste or salvable, raw or finished product.

With only one man, the driver, one Dempster - Dumpster serves scores of big detachable steel containers — sizes 2 to 21 cu. yds... payloads up to 36,000 lbs!



PICK UP



HAUL



DUMP

SERVING COST-MINDED MANAGEMENT ALL OVER THE WORLD

CHEMICAL PROCESSING

Materials handling cost 60% to 80% ? . . .

A FACT-FINDING SURVEY made by one of our engineers in cooperation with officials at one relatively small plant revealed labor cost of that firm's then-present-method was \$6,552.00 annually. Labor cost would be \$1,160.00 with the Dempster-Dumpster System — a saving of \$5,392.00 annually (82 cents out of each \$1.00). Investment in our equipment would amount to \$10,000.00. In less than two years the equipment would pay for itself from its own savings produced for the user.

Results of a survey at a larger plant revealed annual labor cost amounted to \$64,119.00, and would be \$23,304.00 with the Dempster-Dumpster System — a saving of \$40,815.00 (63 cents out of each \$1.00). On an equipment investment of \$40,968.00, the system would pay for itself in one year. In 5 years it would save this company over \$200,000.00!

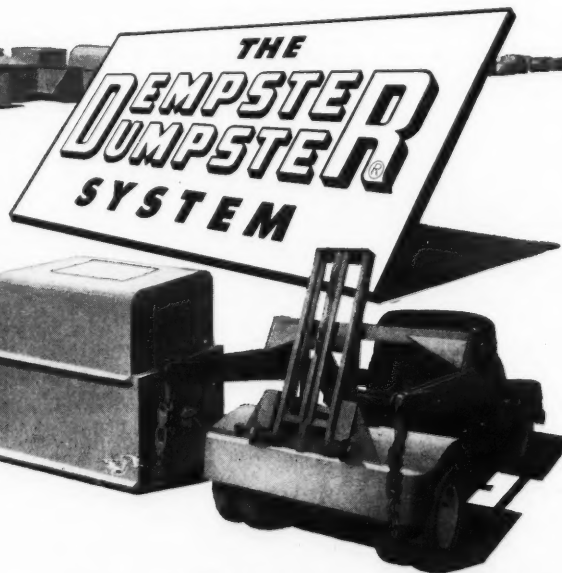
How much can this equipment save you? We recommend a fact-finding survey. No obligation, of course. It is the best way we have found to help you determine what can be expected of this system in your own particular operation. Or, perhaps you would prefer to first receive complete literature, free on request. May we hear from you? *Dempster Brothers, Inc.*



s of big
000 lbs!

DUMP

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes



WORLDWIDE DEMPSTER BROTHERS, 257 N. Knox, Knoxville 17, Tennessee

MATERIAL HANDLING



Tare weights are applied by adjusting control knobs on electronic load cell scale

electronically actuated servo-type indicating mechanism.

When load is placed on scale, compression in each load cell is measured electrically and amplified into signal that operates servo-mechanism in dial head, which can be located at distance from where load is being weighed. Tare weights and unit weights are applied by adjusting control knobs. Scale may be equipped for transmission of digital signals to remotely located office machines where weight data can be added, listed, or tabulated automatically.

(Electronic load cell scales are manufactured by Toledo Scale Company, Dept. CP, Toledo 1, Ohio . . . or for more information check 3539 on the convenient Reader Service slip which is located opposite last page.)

**Fork, handlift, platform trucks —
they're all described here**

Complete line of company's trucks is listed in bound 132-page catalog containing facts and figures, descriptions of features, and "on-the-spot" photographs. Some of the described models include electric fork trucks, stackers, pallet and platform trucks, handlift trucks, skid trucks. Other items include skids, portable cranes, drum and pallet racks, and drum and barrel trucks.

132-page catalog is issued by Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. When inquiring specify 3540 on form opposite last page.

ESSING

MAY 1957

We like to work out
problems that are
"Different"

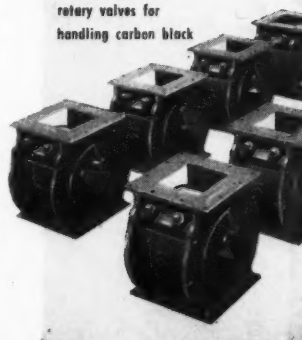


Over the years we have been called on to handle many situations in the conveying field that presented out-of-the-ordinary problems.

Our broad experience, which covers thousands of conveyor installations, and our engineering know-how have invariably been able to produce the right answers.

If yours is a "special" situation, give us the opportunity to prove what we can do for you.

Precise measuring 6" rotary valves for handling carbon black



**INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY**

BIRMINGHAM, ALABAMA



ATLANTA CLEVELAND DALLAS KNOXVILLE
MEMPHIS MOBILE NEW YORK 17

When inquiring check 3541 opposite last page

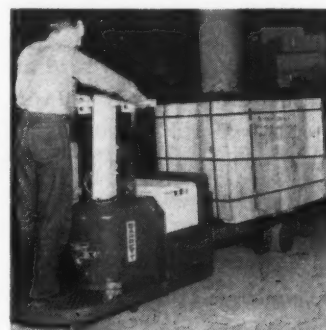
MATERIAL HANDLING

Standup electric lift truck is push-button operated

Uses: Moving heavily loaded skids.

Features: All movements (lifting, lowering, traveling, steering) are electrically controlled by push-buttons located in handle for convenient operation.

Description: Truck is designed to have driver standing on non-slip platform where he can eas-



Operator controls all movements of truck by pushing buttons located on handle

ily control all operations. It can also be used as a walking operator unit.

Truck has 6" lift and is available in 4000- and 6000-lb capacities and with wide range of platform lengths.

("Riding Power Ox" is manufactured by Barrett-Cravens Co., Dept. CP, 628 Dundee Rd., Northbrook, Ill. . . or for more information check 3542 on form opposite last page.)

Electric elevating tailgate fits 1/2-, 1-ton trucks . . .

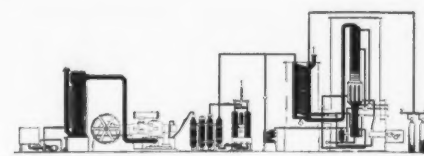
lifts up to 600 lb in 15 seconds by touching button

Uses: Device for loading or unloading 1/2- and 1-ton trucks where no loading platform is available.

Features: One man can load or unload trucks quickly without heavy lifting.

Description: Electric elevating

Make Oxygen



SUPAIRCO plants produce gaseous or liquid oxygen, gaseous or liquid nitrogen, acetylene, liquid air

Do you have our latest catalog?

New catalog describes single and double rectification plants and lists production data, shows flow charts and plant layouts. Single rectification type plants range in size from 300 to 600 cu. ft. per hour capacity, and double rectification type from 900 to 12,000 cu. ft. per hour. Large liquid oxygen plants are available in capacities to 25 tons a day.

Free catalog on request

SUPERIOR AIR PRODUCTS CO.

132 MALVERN STREET • NEWARK 5, NEW JERSEY • U.S.A.

Manufacturers of production and storage equipment for gaseous or liquid oxygen, nitrogen, air, hydrogen and helium

When inquiring check 3543 opposite last page

PUMP LIQUIDS GASES SLURRIES

WITHOUT CONTAMINATION OR
CORROSION



Wavelike Motion of Steel Fingers
Forces Material Through Tubing

Cap. 0.2 cc. per min. to 4.5 G.P.M.

Prices \$60.00 to \$550.00
depending on size and accessories



Write for
Descriptive
Literature

SIGMAMOTOR, INC.
18 North Main St. • Middleport, N.Y.

When inquiring check 3544 opposite last page

CHEMICAL PROCESSING

PERMANENT CORROSION PROTECTION



with **GLASFAB** BRAND
TORCH TAPE in handy tape form

Time tested and proven in years of actual use over thousands of miles of buried pipe, "GLASFAB" Brand TORCH TAPE provides permanent corrosion protection. This service is assured because of its high di-electric resistance together with rot-proof qualities of coal tar pitch reinforced with "GLASFAB" brand woven membrane. One ply application on above grade lines and two ply on below grade piping is recommended. It is available in widths from 2" to 45". TORCH TAPE is conveniently applied without adhesives by heating the surface lightly which permits perfect contouring. The bond is assured and no moisture migration can occur.

Write today for literature on "GLASFAB" TORCH TAPE brochure

TWINSBURG-MILLER CORPORATION
P. O. BOX 207 TWINSBURG, OHIO

When inquiring check 3545 opposite last page

For Bulk Material Handling Operations
U-100LC-U-120LC
Abrasion Resistant
ALL METAL CONVEYOR HOSE



This All Metal Conveyor Hose has a special galvanized carbon steel or magnetic stainless steel liner that withstands severe abrasion and corrosion for handling grains, bulk chemicals, ashes, cement and other bulk granular materials.

Ask for **NEW CATALOG**
ID-100A with Sec. 3D Supplement

Quality . . . ALL METAL FLEXIBLE HOSE PRODUCTS
UNIVERSAL METAL HOSE CO.

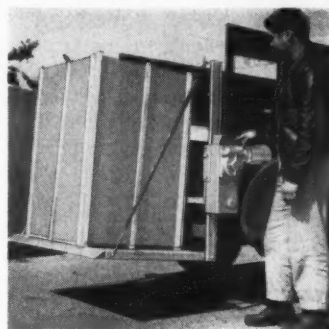
2189 South Kedzie Avenue, Chicago 23, Illinois

When inquiring check 3546 opposite last page

MAY 1957

MATERIAL HANDLING

tailgate, which can lift up to 600 lb in 15 seconds, is geared to eliminate battery drag. Reversible motor has built-in power brake to prevent coasting. Push-button control is constructed to assure safe operation.



Elevating tailgate permits safe, fast, easy loading and unloading

Steel unit weighs 225 lb, and is designed to save rear-end over-balance and provide better weight distribution with larger load capacity. Vehicle can still operate within same license-fee limit. All moving parts run on ball bearings. Unit, delivered fully assembled, can be installed in a few hours.

("Jiffy-Lift" is product of Mid West Body & Mfg., Dept. CP, Paris, Ill. . . or for more information check 3547 on form opposite last page.)

Data on explosion-proof bin level indicator

Features and specifications of explosion-proof and standard models of rotating paddle-type bin level indicators are presented in four-page bulletin. Photographs and cross-section drawings show equipment. Two typical wiring diagrams for automatic bin level indication or control are included.

Form BD-8B is issued by The Bin-Dicator Co., Dept. CP, 13946 Kercheval St., Detroit 15, Mich. When inquiring reader may simply specify 3548 on form opposite last page.



PICK-UP PACK... ONE-TON SIZE

Each of these Drumpak corrugated containers holds 2000 lbs. of bulk granular chemicals. This same amount was formerly packed in 20 hundred-pound units. By consolidating his product in Drumpaks, this manufacturer reduced handling manhours by 80%. The Drumpak is easy to pick up, warehouse and load into freight cars.

Drumpaks are another Gaylord development. To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

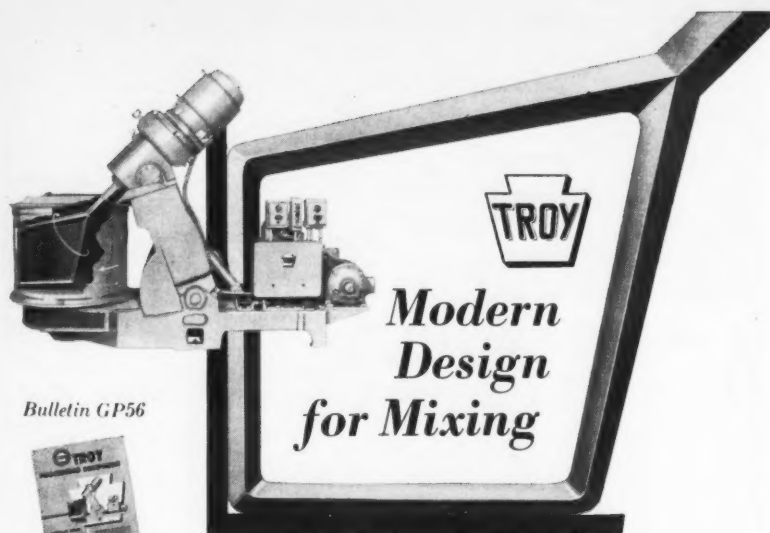


CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 3549 opposite last page



Bulletin GP56



Modern Design for Mixing

**Greater Production—Higher Quality
With Less Cost and Less Effort**

Diamond-shaped agitator of the Troy Angular Mixer provides three-dimensional kneading, shearing, mixing action that *breaks up agglomerates*.

As Change-Can revolves, all zones of the material are thoroughly mixed and blended into a smooth homogeneous batch—eliminating further processing in many cases.

True mixing of heavy, tacky materials is possible with the Troy Angular Mixer . . . designed for *mixing* not stirring.

For a full description of the Troy Angular Mixer, write for 4-page, illustrated Bulletin GP56.



When inquiring check 3550 opposite last page

USE THE

LIFT-O-MATIC

for
HANDLING DRUMS
with a
**POWER
FORK TRUCK**
WITH FORKS
LEFT ON
OR
REMOVED



Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG **MARVEL INDUSTRIES, Inc.**
2234 CLEVELAND ST., EVANSTON, ILLINOIS

When inquiring check 3551 opposite last page

MATERIAL HANDLING

**Adds water to battery cells,
does not overflow . . .**

automatic shutoff eliminates
adding too much water

Uses: Unit was developed for filling cells of industrial batteries with water.

Features: Device controls electrolyte level in batteries by adding water to correct height without overflowing. Unit can be adapted to filling all types of batteries.

Description: Battery-cell filler comes in five models. For indus-



Battery-cell filling unit also used
for washing off top of battery

trial truck use, 15" horizontal and 9" vertical (tube lengths) units are recommended. Unit operates on 20 to 50 psi water supplies.

Filling device uses hydrostatic means for controlling water flow. Stop on tube assures its proper depth of insertion into cell. When the electrolyte level reaches the end of the tube, a spring valve is automatically released and the water flow stopped.

("Rite-Hite" cell filler is product of Gould-National Batteries, Inc., Dept. CP, Trenton 7, N. J. . . or for more information reader may simply check 3552 on the Reader Service slip opposite last page.)

This month's Processing &
Engineering Data section
begins on page 236

Available from
VANTON!

3 LINES OF PLASTIC PIPE, FITTINGS AND VALVES



PVC

(Unplasticized, Unmodified, Polyvinyl Chloride)
For outstanding chemical resistance.



Styrene Copolymer

For exceptional impact strength.



Buna N (Acrylonitrile-Butadiene)

For excellent temperature resistance.

Vanton, with many years of pioneering experience in the manufacture of plastic pumps, now makes available pipe, fittings and valves in the above basic materials. These plastic compounds have been selected to offer as broad a coverage as possible with respect to the application requirements of the process industry.

• For Complete technical information send for Catalog PI101



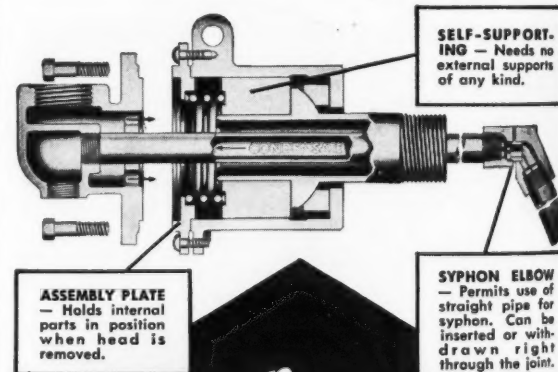
VANTON

PUMP & EQUIPMENT CORP.

201 Sweetland Ave. Hillside, N. J.

division of Cooper Alloy Corporation

When inquiring check 3553 opposite last page



Johnson Rotary Joint with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for thorough flow service, in sizes to meet all operating needs.

WRITE FOR COMPLETE INFORMATION.

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check 3554 opposite last page

CHEMICAL PROCESSING

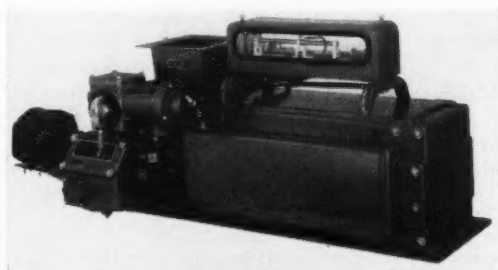
Continuous scale feeder has pneumatic control

Guaranteed minute-to-minute accuracy of $\pm 1\%$ over 3 to 3000-pound-per-minute feed

Uses: Continuous weigher controlling flow of dry, free-flowing materials in accordance with manually set pneumatic signal or in proportion to automatic pneumatic signal from an external source. Unit is suited for continuous blending or automatic batching operations.

Features: Since only electrical component in unit is synchronous motor for driving weigh-belt, feeder can be safely used in hazardous locations.

Description: Force balance system develops pneumatic signal directly proportional to rate at



Feeder features recording and integration of feed rates from measured air signal

which material is delivered by feeder. Air pressure developed is applied to pneumatic controller, which compares "measured" pressure against "set" pressure representing desired feed rate.

(Pneumatic scale feeder is product of Wallace & Tiernan Inc., Dept. CP, 25 Main St., Belleville 9, N.J. . . . or for more information reader may simply check 3555 on form which is located opposite last page.)

Gives specs of LPG systems for line of lift trucks

Specification sheets describe LP-gas systems available on several of company's industrial trucks. Total of five sheets gives data and photographs describing complete line. Figures show performance of eleven pneumatic-tire and three cushion-tire lift-truck models when operated on LPG.

Specification sheets, Forms 1473-6 and 1455A, are issued by Hyster Company, Dept. CP, 2902 NE Clackamas St., Portland 8, Oregon. When inquiring specify 3556 on form which is located opposite last page.



HERE'S LOADER MOBILITY... EXCAVATING STRENGTH

LOADS $1\frac{1}{2}$ CU YD AT A PASS . . . $2\frac{1}{4}$ yd with light materials bucket. Lifts up to 11,200 lb.

WORKS RIGHT UP ON A STOCKPILE where wheels dig in. Can build stockpiles higher, store many more yards of material in a given area.

TURNS IN ITS TRACKS . . . where many smaller loaders have to jockey.

DIGS INTO HARD-PACKED MATERIAL . . . exerts 20,000-lb break-out force, with 72 net engine hp and modern bucket design.

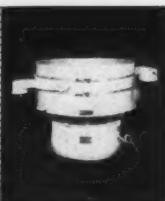
These are just four examples of how an Allis-Chalmers HD-6G tractor shovel offers a combination of strength, traction, flotation and mobility that enables it to replace a fleet of part-time specialized machines. You can count on it to boost production indoors or out, the year 'round. Ask your Allis-Chalmers dealer about the HD-6G . . . also the three larger tractor shovels with capacities up to 4 cu yd. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

When inquiring check 3557 opposite last page

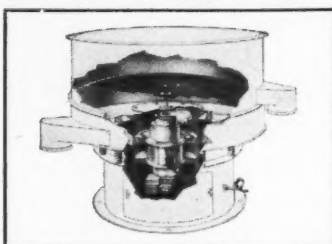
SCREENING NEWS



SWECO Separator Recovers Glycerine at 98.5% Efficiency, 10% Cost of Centrifuge

A 48" diameter SWECO Vibrating Screen Separator, used to remove sodium chloride crystals from a glycerine recovery system in the soap industry, has proved 98.5% effective. The initial cost of the unit is only one-tenth that of a comparable centrifuge. In addition, the SWECO unit's much broader operating range permits use of a more flexible control system.

In reporting on this efficient, economical process in SOAP AND CHEMICAL SPECIALTIES, H. M. Muir points out that the vibrating screen separator can operate straight through to an 80% crude glycerine product. Centrifuge methods now in use stop at 60%, so that all the accumulated salt from the 60-80% glycerine evaporation must be rehandled in the next evaporation cycle. Muir reports that the process is superior to older centrifuge and "salt-extractor" methods, with the added advantages of low upkeep and long screen life.



Cutaway drawing of SWECO Vibrating Screen Separator.

Zehring Solves Shellac Processing Problem With SWECO Separator

Faced with the problem of removing insoluble foreign material from crude shellac without also removing valuable natural wax, the Zehring Chemical Company of Portland, Ore. installed an 18" SWECO Separator. The unit screens 10 to 15 gallons of crude shellac per minute. Insoluble foreign matter is rejected continuously at a consistency of about 75% solids, with only 1½% of solution carried out with reject solids. The portable SWECO Vibrating Screen Separator is used where necessary in the Zehring plant.

Kwal Reduces Screening Time, Saves 8¢ per Gallon With SWECO Separator

To produce high-quality paint for spraying on masonry surfaces, the Kwal Paint Company of Denver must carefully control the size of the contained aggregate particles. Kwal installed an 18" diameter SWECO Vibrating Screen Separator. This portable unit screens a batch of 115 gallons in less than an hour. Elimination of four hours of hand screening is equivalent to saving 8 cents a gallon of paint.

A complete data file on screening chemical products plus a 22-page catalog are yours for the asking. Write for Bulletin S-104-3.



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Engineers and Constructors... Manufacturers

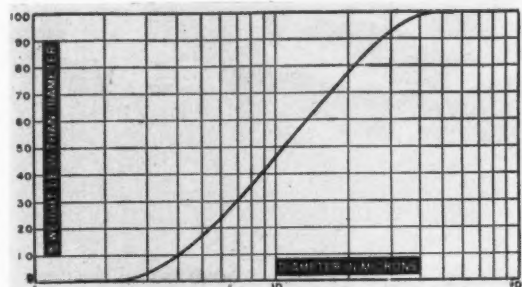
for the laboratory

For more information in less time with less manpower, Smith, Kline and French Laboratories use particle size distribution analyzer. Researchers make...

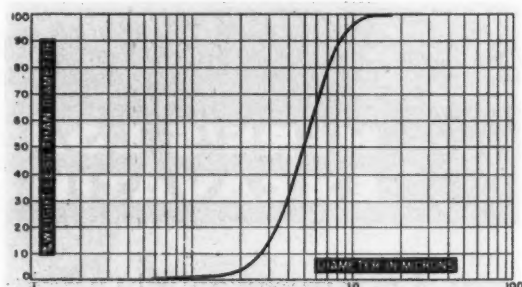
"pin-point" particle
...quickly...easily

WILLIAM C. CLARKE, Assistant Editor

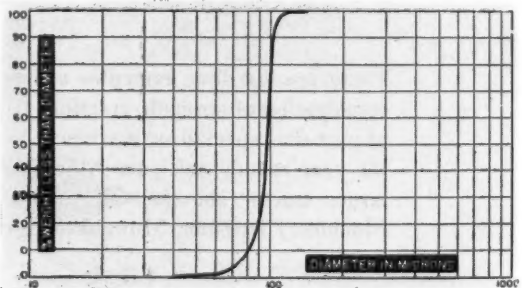
W. C. ELLENBOGEN, Head, Analytical Section
Research and Development Division
Smith, Kline, and French Laboratories
Philadelphia, Pennsylvania



Typical wide-size distribution of ground limestone is representative of milled and classified or fine-sieved materials. Others are clays, cement, powdered metals, plastics, and first-stage pigment reduction. Time for test: 2 hours



Sample with medium-size distribution after prior classification. Chart made after great care had been taken to reduce the powder to a maximum particle size of 12 microns by use of special equipment. Analysis showed that 50% of the material was between 3.6 and 6.6 microns. Time for test: 2 hours



Sample with very narrow size distribution. Spherical glass powders were produced, then tested. Instrument analysis was similar to that by microscopic analysis. Time for analysis: 15 seconds

Problem: To add to their problems in developing a new pharmaceutical product, researchers at Smith, Kline, and French Laboratories, manufacturers of ethical pharmaceuticals, found that particle size, in micron range, of one or more raw materials was affecting behavior and activity of final product. Even particle size of a processed intermediate was found to be important.

Although conventional methods of particle analysis furnish particle size readily, researchers also found that average size was not as important as another factor — particle size distribution.

Although most details of the particular problem are confidential, it can be mentioned that the Laboratories are working currently with materials ranging from 5 to 150 microns in size — and sometimes even finer.

Solution: Unusual particle size distribution analyzer was installed and used throughout development of the product. Particle size distributions of various raw materials and process intermediates were studied. Correlations were made on behavior and activity of final product with information on particle size distribution.

In using the instrument at the Laboratories, time required to run an analysis depends on whether the material has been run before. If not, certain experimental conditions must be determined and the analysis will take about two days. Time for subsequent analysis is much shorter, requiring only about 1½ hours.

Times mentioned are for samples that range from ten to one hundred microns. If the powders are coarser, less time will be required. If they are finer, much more time will be required. The time may also be shortened for routine runs where the last little bits of information at the extreme ends of the scale may be omitted.

When inquiring check 3558 opposite last page

article
asily
distribution analyses
...accurately



Laboratory personnel placing sample in powder sample feeder and disperser. The test run is started by pressing a "firing" button located above recording chart. A burst of nitrogen discharges the powder sample through the disperser into the sedimentation column

While the desired particle size information could have been obtained with more conventional equipment, total man-hours required by the distribution analyzer (the Micromerograph) for the size distribution studies are much less. In addition, more information is given (on distribution) than is developed by other units which give data on average particle size only. The data are also very

(Please turn to page 183)

JUST PLUG IT IN... AND START MULLING



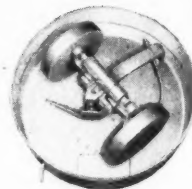
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lightweight mullers, lets you
adjust pressure to mull any
material.



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The Simpson Porto-Muller is designed to fill a real need for a low cost—high efficiency muller in the 2½ to 3½ cubic ft. batch capacity range for the proper preparation of dry, wetted or plastic materials. As such, it is preferred for pilot plants and small production requirements. It's a versatile, efficient and completely self-contained mixer "package". With it you can duplicate the same high quality of mixing; realize the same mixing economies and be *assured* of the same rugged construction that has made the name Simpson Mix-Muller a standard of mixing quality for over 45 years.

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SIMPSON MIX-MULLER® DIVISION

National Engineering Company
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When inquiring check 3559 opposite last page

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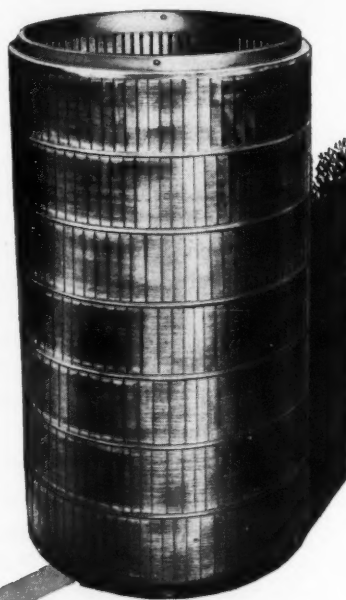


A Complete Line of Filters Including — FLO-KLEAN

LOWEST OPERATING AND MAINTENANCE COST . . . COMPLETELY AUTOMATIC . . . CONTINUOUSLY SELF-CLEANING with NO LOSS OF BACKWASH FLUID . . . LOW PRESSURE DROP

Ideal for removing sand, dirt and other solids from process liquids, these wire-wound filters handle large volumes of water and similar low-viscosity fluids. Standard single units are available for flow rates up to 15,000 gallons per minute. Mechanical construction makes it possible to guarantee 100% removal of all particles larger than the stated diameter. Filtration from .0025" to .030" (230 to 25 mesh) can be supplied.

* No one type of filter is best for every need, Cuno — and only Cuno — offers you a truly complete line that includes several distinct types of filter media. And Cuno also offers you a complete application engineering service through the Cuno Field Engineer in your area. This specialist is fully qualified to help you select the right filter type and model to solve your problems.



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FILTERS

In Principal Cities

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LABORATORY

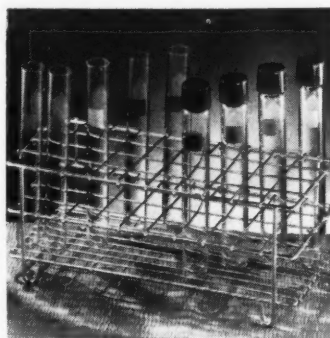
**Color-coded cultures —
seven-hued tubes
speed work . . .**

red, yellow, green, black, blue,
white, clear identify samples

Uses: Color-coded culture tubes are recommended for use where large numbers of samples of various materials are being handled.

Features: Each tube bears a one-half inch square of permanent color. Code colors include red, yellow, green, black, blue, white, and clear glass.

Description: Color marking greatly reduces need for labeling. Identification can be made quickly



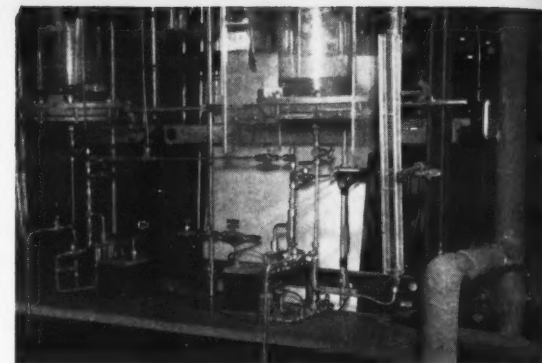
Three sizes of culture tube, two types of closures are available

— even from a distance. Tubes, however, do have an etched marking spot for additional information.

Two types of culture tubes are available: screw-capped and plain end. Screw-capped tubes use plastic closures. Plain tubes have three overflow capacities: 24, 28, and 55 ml. Screw-capped tubes have 20, 30 or 50 ml capacities. Length of all sizes is 150 mm, capacity difference depending on outside diameter.

(Color-coded culture tubes are a product of Owens-Illinois Glass Co., Dept. CP, Toledo, Ohio . . . or check 3561 opposite last page.)

This month's Processing &
Engineering Data section
begins on page 236



CORSON-CERVENY MICRO BELLOWS PUMPS deliver feed materials to Koppers Research Bench Scale Pilot Plants

When developing bench scale continuous processes requiring accurately proportioned feeds, Koppers' Verona Research Center scientists turn to the Corson-Cerveny Micro Bellows Pump. Due to simplicity of construction with consequent ease of maintenance and cleaning, this pump has been first choice on many important operations.

This is another of the many ways the Corson-Cerveny Micro Bellows Pump helps research and development laboratories, especially where highly corrosive liquids are being pumped. These pumps, because they are fabricated of stainless steel and designed to eliminate packing, are free of corrosion. Write for descriptive bulletin.

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When inquiring check 3562 opposite last page

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When inquiring check 3563 opposite last page

CHEMICAL PROCESSING

Particle Size Distribution

(Continued from page 181)

reliable, being reproducible to a large extent.

Basic operating principle of the analyzer is simple. A well-dispersed cloud of particles is introduced into the top of a sedimentation column. Particles are allowed to fall onto the pan of a servo-electronic balance at the bottom. Accumulating weight on pan is counter-balanced by an electrical current and recorded on a moving chart millimeter.

By use of a template furnished by the manufacturer, chart record is converted into a continuous particle size distribution curve. Template incorporates Stoke's Law of Fall into the chart record of weight versus time. For a non-spherical particle, "size" measured by the instrument is diameter of a sphere which falls at the same rate.

To increase reliability of sampling, sample size, approximately 1/10 gram, is relatively large. Dispersion of the sample is caused by a high-pressure dried gas (nitrogen). Dispersing mechanism consists of a machined and polished cone which fits a mating conical seat. Annular region between the two surfaces forms the dispersing space. Spacing can be set to desired value by turning a lever calibrated directly in microns.

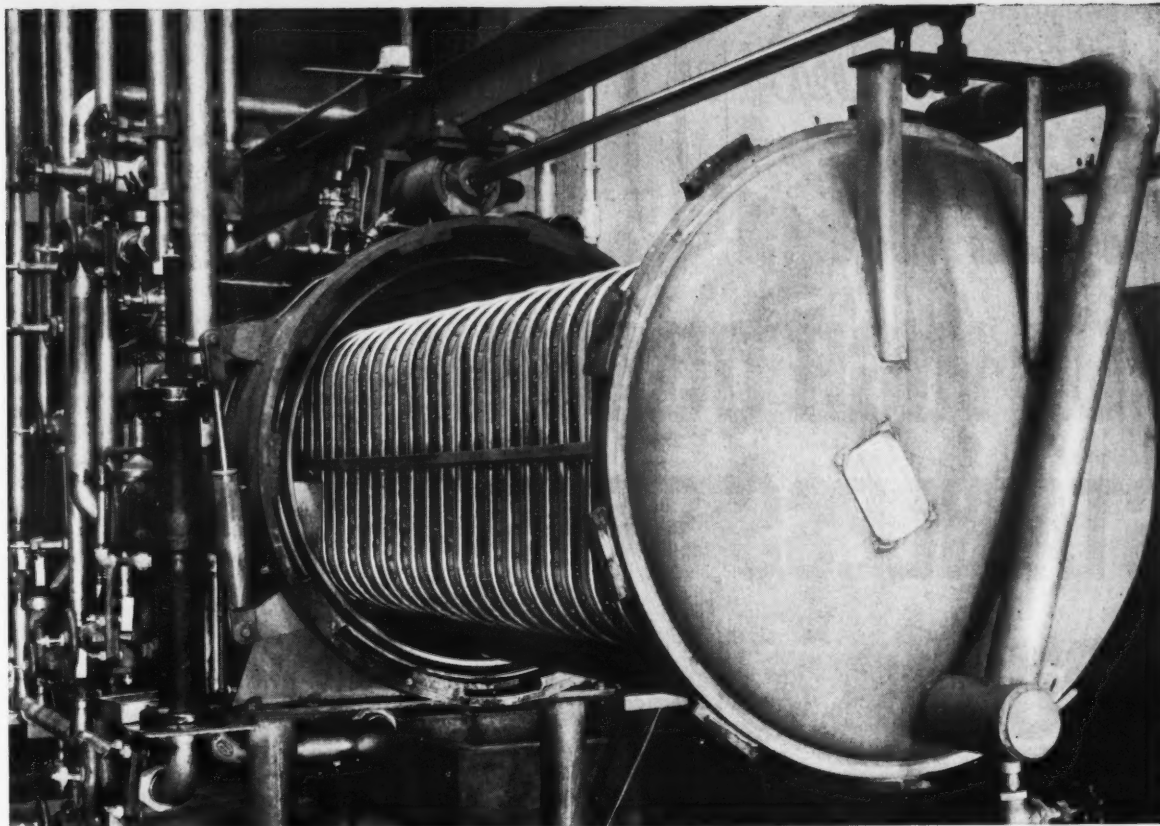
Sedimentation column is made of aluminum, insulated with a fiber glass blanket. Tube is 85 inches long and has a 3 1/2 inch ID. Large settling distance (220 cm) compared with relatively small dimensions of burst of particles from the disperser makes insignificant any difference in settling times of the same-sized particles.

Dispersing unit is easily disassembled for cleaning. All that is required is that the sedimentation column be turned aside from disperser. Pressing a button causes the powder sample feeder and related units to be cleared of any powder particles remaining in system. Other than a cylinder of compressed dry nitrogen, no accessories are required for operation of the instrument. Analyzer requires only 28 inches of floor space and a nine-ft ceiling.

Results: Now that the research project has passed beyond the development stage, and out of the hands of the Research and Development Division, the analyzer is used to control the particle size distribution of the raw materials and intermediate products.

An additional advantage of the instrument has been found to be that it can be operated by laboratory technicians. Permanent recording eliminates personnel errors to a large extent and permits rechecking of calculations. The rapid particle size distribution analyzer not only gives particle distribution analyses, but does it quickly, easily, and accurately . . . and with less manpower.

(Micromerograph is product of the Sharples Corporation, Dept. CP, 2300 Westmoreland St., Philadelphia 40, Pa. Check 3564 opposite last page.)



How Industrial Filter gets the profit out of fruit juice "Tank Bottoms"

The trouble with natural fluids is their variability—not only differences in batches but their tendency to stratify in storage. The latter was the problem in handling fruit juice at an eastern plant—the bottom layers in tanks were heavy with particles of valuable crystallized sugar that were lost in clarification. With their new Industrial filter system they extract the sugar at a handsome profit that paid for the system in a few months.

Industrial's Horizontal Filter clarifies juice and recovers sugar in one continuous operation. The filter is first pre-coated and clarification established. The juice is then flowing from the storage tank thru the filter and on to the processing lines. After the filter leaves have built up the maximum coating, the filter is blown dry and a mixture of water and air is injected under pressure. The water dissolves the fruit sugar and is continuously filtered out until the sugar content drops below 2% of soluble solids. The filter is then emptied, opened and the cake is recovered. Most Industrial Horizontal Filters have mechanical shakers

that drop the cake directly into a truck for fast clean recovery of solids.

Industrial engineered filtration is not only cost saving... it's downright profitable! Besides the lucrative recovery of solids, this up-to-date unit operates at a high filtration rate, it requires only one man to run it, it eliminates the buying and washing of filter press cloths, and its all-around efficiency requires less filter aid.

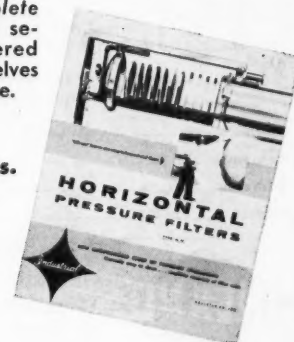
Industrial produces all types of filters . . . Horizontal, Vertical, Tubular, Hydra Shoc . . . and can recommend, without partiality, a filter most suitable to your particular requirements. A great variety of cost-saving optional features are available and almost all Industrial Filters are adaptable to complete automation. Intelligently selected, soundly engineered filters can pay for themselves in a surprisingly short time.

Write for Bulletin NH-122, a complete description of Industrial's Horizontal Filters.



INDUSTRIAL

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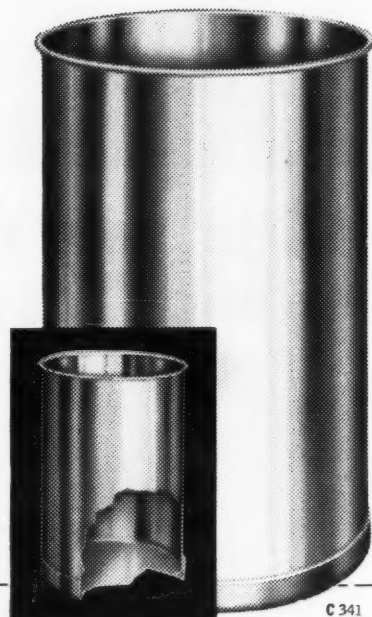
When inquiring check 3565 opposite last page

whether you need 1 or a carload

CALL ON **INLAND** FOR HIGH QUALITY STAINLESS STEEL DRUMS

If you process or store pharmaceuticals, meat products, high purity chemicals or any other products where absolute control of sanitation is necessary, Inland Stainless Steel Process Drums will make your job easier. Their durable, all-welded, stainless steel construction insures long life, and their special sanitary bottoms with smooth, rounded interiors permit complete emptying and easy cleaning and sterilizing.

Manufactured in 30 or 55 gallon capacity sizes, from many types of stainless steel, Inland Process Drums are also available with covers, or with 1-bar or swedged rolling hoops. Call on Inland for your stainless steel shipping drums and pails too!



C 341



"The Use and Care of Stainless Steel Drums"

Here is a useful, new booklet. It gives valuable information on how to use and get maximum life from stainless drums and fully describes the Inland line. Send in this coupon for your free copy.

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Full line of steel and stainless steel shipping and processing containers, including galvanized and heavy duty ICC drums.

When inquiring check 3566 opposite last page

LABORATORY

Gives 'drain-free' surface for easy cleaning

Uses: Silicone fluid coats glassware, ceramics, metal, rubber, and plastic materials to impart surface that is stable and inert to heat, moisture, common chemicals.

Features: Concentrated silicone fluid is water soluble and can be diluted with ordinary tap water for application. Fluid gives "drain-free" surface for easy cleaning.

Description: Concentrated silicone fluid is diluted 100 to 1 with tap water for glass, ceramic, and enamel products. Objects to be treated are simply dipped into



Four-ounce bottle will make 25 pints of 1% solution

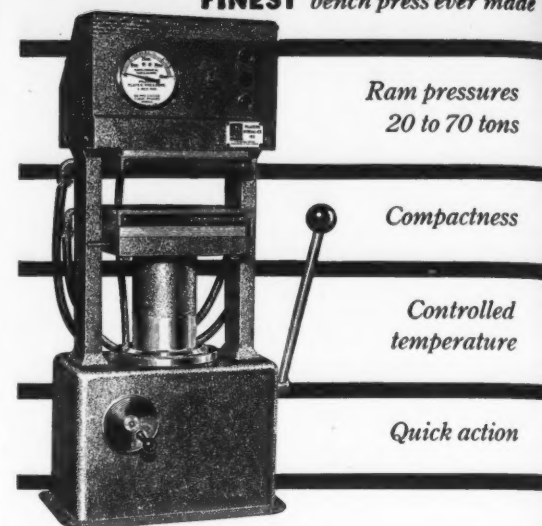
solution for five seconds, rinsed in clear water, and allowed to air-dry for 24 hr. Metal, rubber, and plastic materials require a higher concentration (1:20), and should be immersed for 10 min.

Treated surface becomes moisture repellent, scratch resistant, and resistant to alkaline cleaning compounds.

Fluid is packaged in 4-oz bottles, sufficient to make 25 pints of 1% solution — enough to coat 650 dozen 6-inch test tubes.

(Siliclad silicone coating is product of Clay-Adams, Inc., Dept. CP, 141 E. 25th St., New York 10, N. Y. . . . or for more information reader may simply check 3567 on handy form opposite last page.)

FINEST bench press ever made



Ram pressures
20 to 70 tons

Compactness

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temperature

Quick action

We build presses for every purpose in the fields of rubber and plastic moulding, laboratory testing and graphic arts. Write for circular or if you prefer we'll have our nearest representative call on you...

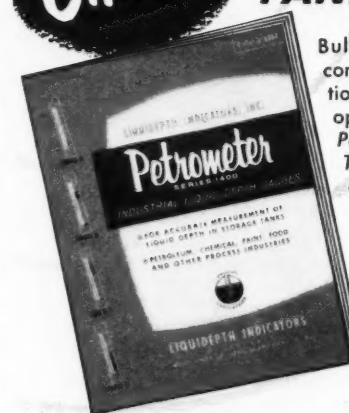


Pasadena Hydraulics, Inc., 1433 Lidcombe, El Monte, Calif.

When inquiring check 3568 opposite last page

How to
Choose

THE RIGHT REMOTE READING TANK GAUGE



Bulletin 6004 presents comprehensive information on the selection and operation of the New Petrometer Series 1400 Tank Gauges. It also describes the many new design features incorporated in the indicators to provide quick, easy installation, trouble-free automatic operation and accurate indication.

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When inquiring check 3569 opposite last page

CHEMICAL PROCESSING

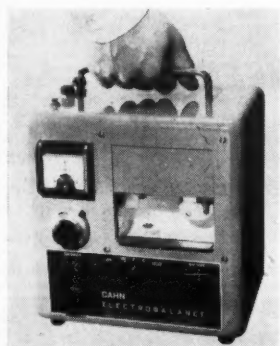
Microbalance can be carried— operated on any bench

Instrument is virtually unaffected by shock, vibration, or temperature change

Uses: In addition to usual applications for microbalances, instrument — because of ruggedness and easy operation — can be used by relatively untrained personnel in fields other than micro-weighing.

Features: Sample weight is read directly on multi-turn dial. Instrument is virtually unaffected by shock, vibration, or temperature change.

Description: Instrument operates by balancing torque developed by a sample weight against torque applied by an electric current in a magnetic field. Because balance is returned to same position, torque is proportional to current.



Microbalance can be carried around laboratory

Complete weighings require less than one minute. Microbalance has four ranges of sample weight: 0 to 5 mg with one microgram sensitivity, 0 to 10 mg at two microgram sensitivity, 0 to 20 mg at five microgram sensitivity, 0 to 50 mg at eight microgram sensitivity. Accuracy is 0.05% of full scale on all ranges.

(Electrobalance is product of Cahn Instrument Company, Dept. CP, 7712 Danvers St., Downey, Calif. . . . or for more information check 3570 on form located opposite last page.)

Paper electrophoresis system and what it can do

Continuous-flow paper electrophoresis system is illustrated in four-page bulletin. Designed for producing high-purity fractions in quantity, equipment processes up to 10 ml per hour. Units have provisions for 16 or 32 fraction-cuts. Automatic fraction collector for handling up to six cuts over period of 60 hours is available. Specifications and schematic drawing are included.

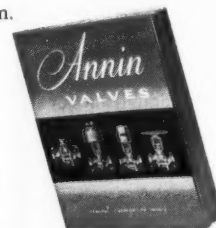
Form 4-CP is issued by Spinco Division, Beckman Instruments, Inc., Dept. CP, Stanford Industrial Park, Palo Alto, Calif. When inquiring specify 3571 on form opposite last page.



Split second action ...small flow control ...at 6,000 psi

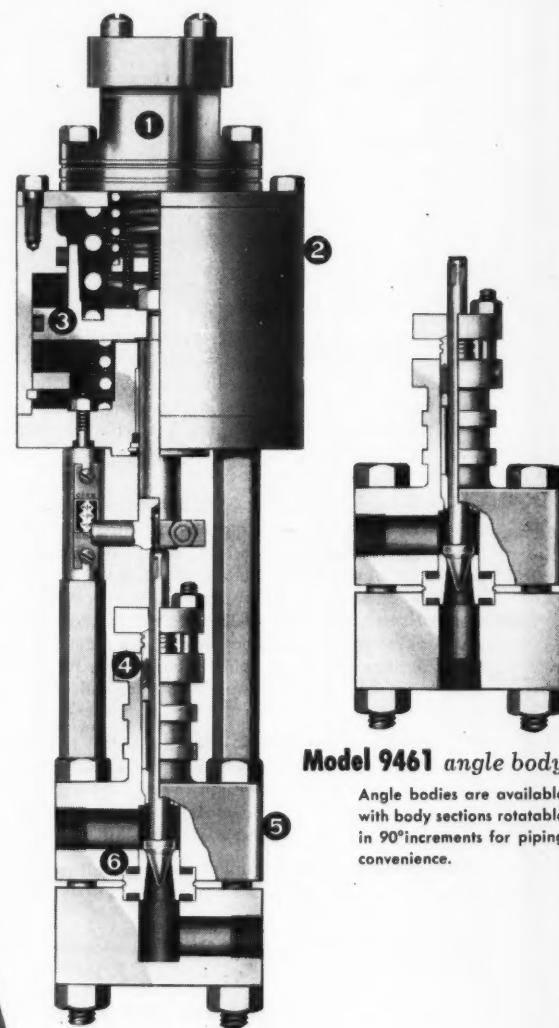
New achievement by Annin in high pressure control and precise valve response for Research— Development—Process applications

Annin's new Model 9460, designed for working pressures to 6,000 psi, provides research, pilot plant and process control engineers with an extremely responsive small flow control valve suitable for low capacity systems. The operator will fully stroke in either direction in 0.75 seconds or less. New design features include: **1** integral positioner, open-on-air-failure or close-on-air-failure action; **2** Annin's 600 Series Domotor operator; **3** differential area piston, eliminating need for loading regulator; **4** universal stuffing box for -400°F to 750°F; **5** offset globe or angle body design; **6** valve plug stem and seat ring common to both globe and angle bodies. For reliable fluid control and flexibility of application Annin offers the best source for solving any small flow control problem.



YOURS FOR THE ASKING—

Complete information and specifications are contained in Bulletin No. 9400. Write for your copy today.



Model 9461 angle body

Angle bodies are available with body sections rotatable in 90° increments for piping convenience.

ANNIN

Control VALVES

THE ANNIN COMPANY
DIVISION OF THE ANNIN CORPORATION
6570 Telegraph Road, Los Angeles 22, California

When inquiring check 3572 opposite last page

ONE Instrument Now Controls Temperatures From MANY Points

**T-E's
New
Multi-
Point
Controller**



This new, Multi-Point, Pyrometer Controller now provides—in one instrument—automatic temperature control for up to ten separate process units. Alone, it handles installations that formerly required as many as ten individual instruments. Immediate advantages are obvious—a great reduction in necessary panel board space, a tremendous decrease in initial cost, much lower maintenance costs, and the time-saving convenience of setting and observing temperature controls at one location.

It applies to practically any installation suitable for two-position control action—creep test machines, multi-zone ovens and furnaces, laboratory aging and reaction vessels, batteries of batch process units, and many others. Simple adjustments permit skipping of one or more points—providing optional control of four to ten units. Control settings consist of ten separate slide wires with ten individual set points. Red and green signal lamps indicate temperature conditions for each point. Scale ranges for all calibrations run from -400°F. with C-C to $+3250^{\circ}\text{F.}$ with Plat. 30% Rh.—Plat. 6% Rh.

Measuring Accuracy is insured by the null balance potentiometer measuring circuit, which permits calibration independent of thermocouple and extension wire resistance. Potentiometer accuracy depends on the stability of fixed circuit resistors, not on less dependable mechanical elements.

Operating Speed is usually three seconds per point, 30 seconds for all 10 points. Gears for other speeds are available and easily changed in the field.

High Sensitivity starts corrective action after deviation from set point of only 1°F. for I-C and 1.5°F. for C-A.

Write for EDS-25-R

Thermo Electric Co., Inc.

SADDLE BROOK, NEW JERSEY

In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

When inquiring check 3573 opposite last page

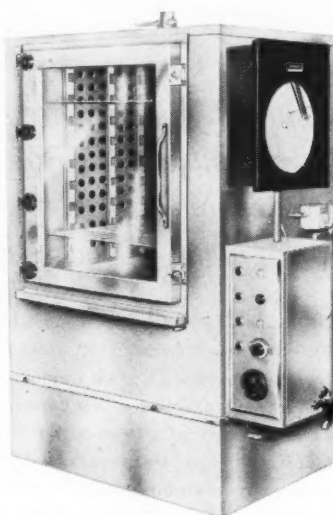
LABORATORY

**Has controlled humidity
and temperature . . .**

oven is all stainless steel to
resist corrosion

Uses: As test oven for pilot plant, laboratory, and industrial testing of chemicals, plastics, packaging materials, even to rigid accuracy of government specifications.

Features: Test oven is designed to give exact temperature and humidity control. Temperature range is continuously adjustable from ambient to 100°C. Relative humidity is adjustable from 20 to 100%.



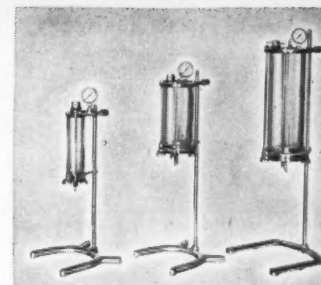
Test oven allows controlled humidity and temperature

Description: Mechanically connected oven has two pens (separate wet and dry bulb pens), completely sealed humidity chamber with viewing window, built-in water filter, and is entirely stainless steel.

Humidity is developed by atomization and vaporization of water. Silicone rubber gasket provides positive moisture-proof closure when door latches are applied.

Interior is $24 \times 20 \times 30''$ high. Exterior is $46 \times 31\frac{1}{2} \times 64\frac{1}{2}''$. Oven operates on 115 or 230v AC.

(Model 8091 is product of Electric Hotpack Co., Dept. CP, 5033 Cottman St., Philadelphia 35, Pa. Check 3574 opposite last page.)



Illustrated above, left to right: Model 9; Model 10; Model 21 and 21-1.

MODEL	CAPACITY Cu. In.	CAPACITY Ounces	SHEET Dia.	AREA Sq. In.
21-1	2730	128	5 1/2"	23
21	2800	96	5 1/2"	21
10	1200	48	4 1/2"	9.42
9	300	9	2 1/2"	3.34

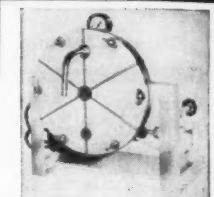
• The Ertel Cylinder Type Laboratory Filter is one of the most important pieces of equipment in hundreds of modern laboratories throughout the world. Available in either stainless steel, hard rubber, plastic, or brass nickel plated material, to meet all filtration requirements.

One of the features of the filter is that it will accommodate any type filter medium. Construction permits refill without disassembly. Thumb screw permits raising or lowering the unit to accommodate various height vessels.

MODEL E-1 FILTER in brass nickel plated or stainless steel. Holds one 10" dia. filter sheet. Shipped with pump and motor. For lab or 5 to 10 gallon batch use.

**ERTEL
LABORATORY
Cylinder Type
FILTERS**

- Sizes for all laboratory filtration requirements
- Accommodates Standard Ertel Asbestos Filter Sheets as well as any other type filter media



ERTEL ENGINEERING

CORPORATION
KINGSTON 3, NEW YORK

Branch Office & Showroom Located in New York City

COMPLETE LINE OF

Liquid Handling Equipment



When inquiring check 3575 opposite last page

see dangerous processes safely with
LENOX INDUSTRIAL PERISCOPES

Use a LENOX PERISCOPE to view hazardous processes and thus avoid danger and remove inaccessibility. These periscopes pass through walls, explosive or contaminated atmospheres, around corners and obstructions to permit the study and control of some phase of industrial work from a remote point.



A window on your industrial process

- A LENOX PERISCOPE is a tubular viewing device (often including angular bends) in which a distant image is carried through lenses and prisms to the eye.
- Angle of view or magnifying power can be modified by built-in mechanisms to change objectives or to operate scanning devices in the viewing head. This permits considerable flexibility in following moving objects or hazardous processes.
- Provision for high pressures, temperatures or harmful radiation can be furnished.

Let a LENOX PERISCOPE be a window in your industrial process. Write, wire or call with details of your application and for a bid on a suitable instrument.

**LENOX
INSTRUMENT COMPANY**

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When inquiring check 3576 opposite last page

CHEMICAL PROCESSING



for RELIABLE MONITORING in Hazardous Locations...



EXPLOSION-PROOF ANNUNCIATORS (Type EKP-4)

Wherever processes or systems in hazardous locations must be monitored with unwavering safety, consider Scam Explosion-Proof Annunciators. These rugged alarms provide a sturdy housing that is approved for Class I, Division I, Group D locations.

INCLUDES ALL THESE SCAM FEATURES:

- Four alarms in one housing...requires little piping, low installation costs!
- Standard for "Sequence A" (visual-audible), other sequences on special order!
- All relays mounted on plug-type jack... for maintenance just plug spare jack into housing!
- Only four holes required for easy panel mounting!

For Constant Protection for Your Monitoring Needs, Choose a Scam Explosion Proof Annunciator.

For special Explosion Proof Systems, consult with us or one of our representatives.

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opposite last page

MAY 1957

LABORATORY

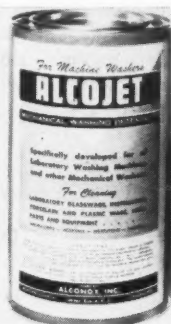
**Laboratory glassware cleaner
is highly soluble, rinses
in hard or soft water...**

controlled foaming allows use in laboratory
washing machines

Uses: Cleans laboratory glassware, porcelain
and plastic ware, small machine-component parts.

Features: Laboratory glassware cleaner is highly
soluble and rinses in hard or soft water.

Description: Cleaning compound has been
formulated to facilitate
removal of dirt, blood,
bacteriological media,
tissue, body secretions,
lime deposits, oily films.
Foaming powder of
cleaner is controlled to
allow efficient use in
mechanical washers hav-
ing jets, sprays, impel-
lers, or pumps. Use re-
quires only about one to
one-and-one-half ounces
for each eight to ten gal-
lons of water. Cleaner
reduces water spotting.

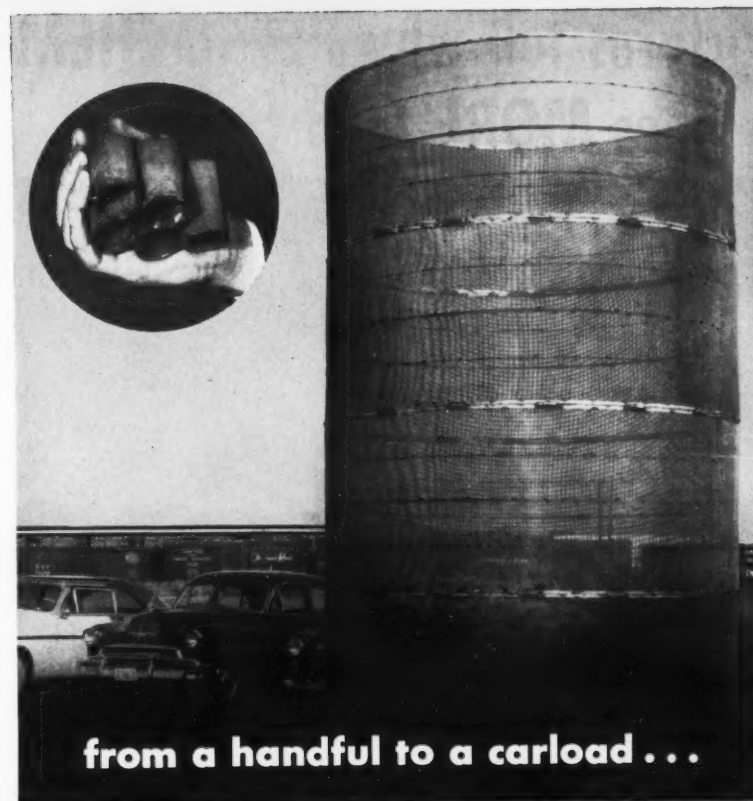


Mechanical washing
detergent has con-
trolled foaming

(Two-pound sample of Alcojet glassware cleaner is available without charge on letterhead request from Alconox, Inc., Dept. CP, 61-63 Cornelison Ave., Jersey City 4, N. J. . . or check 3578 on form opposite last page.)



"I've been wondering when you'd get
around to that!"



from a handful to a carload...

Cambridge offers you complete wire cloth fabrication facilities

From giant retaining screens for catalysts for filter media to small strainer assemblies for Diesel engines, fabrication of wire cloth parts to a wide variety of demands is a daily operation at Cambridge. Whatever your needs . . . filter leaves, strainers, sizing screens, retaining screens . . . you can rely on Cambridge for quality and prompt service. We'll work from your prints or draw up prints for your approval.

IF YOU BUY WIRE CLOTH IN BULK,
we can give you immediate delivery from
stock on large or small orders from the most
frequently used types of cloths . . . from the
finest to the coarsest mesh.

Accurate mesh count and uniform mesh size are
assured by individual loom operation and
careful inspection just before shipment.

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for wire cloth. Call your Cam-
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under "Wire Cloth" in your
classified telephone book. Or,
write direct for FREE
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and stock list giving
full range of wire
cloth available. De-
scribes fabrication fa-
cilities and gives use-
ful metallurgical data.



The Cambridge Wire Cloth Company

WIRE
CLOTH

WOVEN WIRE
CONVEYOR
BELTS

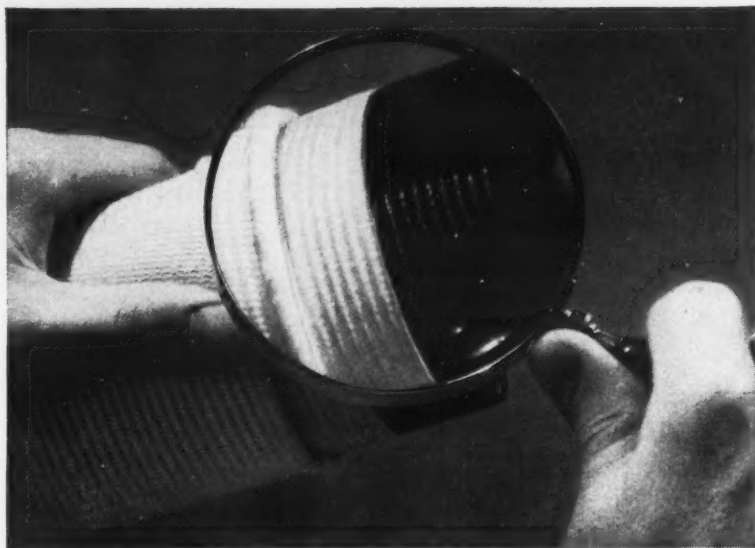
WIRE
CLOTH
FABRICATIONS

DEPARTMENT F,
CAMBRIDGE 5,
MARYLAND

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

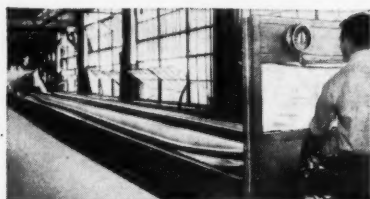
When inquiring check 3579 opposite last page

Pictures tell why PETROCHEM does MORE than fight fire

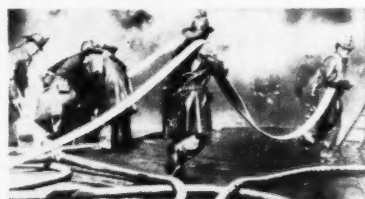


IT'S RUGGED . . . stands up to abrasion, resists weather. PETROCHEM'S oil-resistant Neoprene tube is enclosed in a tough, wear-defying Dacron* jacket. It's a rugged, light, flexible fire hose that wears and wears.

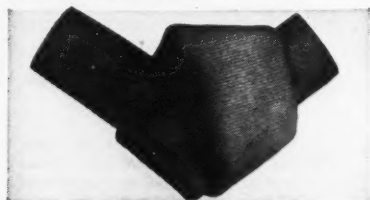
*Reg. T.M. E. I. Dupont de Nemours & Co.



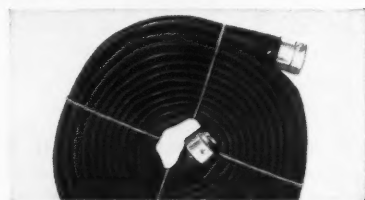
IT'S STRONG . . . strong enough to withstand 500 lbs. pressure and 300°F. temperature.



IT'S OIL AND CHEMICAL RESISTANT . . . fights off deterioration both inside and out.



IT'S FLEXIBLE . . . so flexible it takes tight twists without injury.



IT'S EASILY COILED . . . requires a minimum of storage space.

These are the reasons why it will pay you to consider PETROCHEM fire hose in your safety planning. Your Quaker-Quaker Pioneer distributor provides extra-fast service. See him today. For more information, please write to: H. K. Porter Company, Inc., Quaker Rubber Division, Philadelphia 24, Pa., or Pittsburg, Calif.

HKP QUAKER RUBBER DIVISION
H. K. PORTER COMPANY, INC.

When inquiring check 3580 opposite last page

briefs

from contemporary publications

Properties of polymers

Viscometric measurements in suitable solvents enable approximations of molecular weight and root mean square distances between the ends of linear polymer chains. Correlation of these measurements in a simple equation suffices when constants in the Staudinger formula are not known or where data from absolute methods can not be easily obtained. Two pages, one figure, 17 references. ("Industrial and Engineering Chemistry," February 1957, page 303.)

Design to resist corrosion

From wide experience with heat exchangers and other equipment in chemical plants, a Blaw-Knox engineer gives practical suggestions for minimizing corrosion through consideration of temperature, surface conditions, stresses, and contact of dissimilar metals. Five pages, 13 figures. ("Plant Engineering," January 1957, page 100.)

Average sample number

Comparisons of single, double, multiple, and true sequential sampling are made on basis of extent of inspection they require, as measured by average sample number. This paper, by Burr of Purdue University, discusses average sample number and its relation to truncated sampling. Three pages, one figure, five references. ("Industrial Quality Control," February 1957, page 5.)

Paraffin waxes

Specifications for paraffin waxes are becoming increasingly rigid. Paper deals with effects of composition on properties of such waxes. Melting and transition points, strengths, glosses, hardness values, and resistance to water and scuffing are featured. Seven pages, four tables, four figures, 18 references. ("Petroleum Refiner," January 1957, page 180.)

Hypalon

This detailed report on chlorinated polyethylene rubber includes uses for molded and extruded parts and for coatings. Chemical resistance and electrical properties are featured. Five pages, seven tables, one figure, five photographs. ("Materials and Methods," January 1957, page 96.)

Freon-12

Data on Freon-12 include superheat for 10, 15, and 20°F, and specific volumes, enthalpies, and entropies; they are listed against temperatures of the saturated vapors. Two pages, two tables. ("Air Conditioning, Heating, and Ventilating," January 1957, page 67.)

Pyrrrolizidine alkaloids

Recent developments in the chemistry of the senecio alkaloids are discussed. Biogenetic relations of the necic acids are described. Twelve pages, one table, 51 references. Summary in English. ("Angewandte Chemie," January 1957, page 5.)

"Zytel" resin

"Zytel" resin, a member of the nylon family, is a molding material with real possibilities in view of cost, wear and abrasion, impact, resistance to chemicals, weatherability, oxidation, and hydrolysis. Three pages, four tables, three photographs. ("Mechanical Engineering," December 1956, page 1118.)

Measuring mass flow

Mass flow rates are often more important than volume flow rates. Methods for measuring mass flow rates are presented. Five pages, eight figures. ("Control Engineering," February 1957, page 90.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Chlorine dioxide

Descriptions of the following processes for generating chlorine dioxide are outlined briefly: Mathieson, Solvay, C.I.P. (Rapsan), Perrson-Angel, Kesting, Brown-Day, and sodium chlorite chlorination. The Holst batch system in use in Swedish pulp mills and in one at Harmac, Nanaim, British Columbia, is covered in considerable detail. Six pages, seven figures, six references. ("Pulp and Paper Magazine of Canada," February 1957, page 83.)

Fractionating columns

From England come simple methods of value in design of bubblecap plate columns. Handling capacities, height of liquid in downcomers, calculation of crest heights, efficiency, plate stability and spacing, entrainment, and design of caps are all considered. Six pages, one table, six figures, 25 references. ("British Chemical Engineering," January 1957, page 21.)

Piping for high-pressure steam mains

Metallurgical considerations that pertain to piping for high-pressure, high-temperature steam mains are presented in some detail. Chromium, nickel, and molybdenum contained in steel for such piping will characterize future practice. Six pages, four tables, 10 references. ("Blast Furnace and Steel Plant," February 1957, page 1.)

Strain-aging

Strain-aging of aluminum and aluminum-magnesium alloys at liquid-air temperatures is reported. Strain-aging of superpure aluminum is caused by migrations of interstitials to dislocations. In aluminum-magnesium alloys, local distribution of solute atoms takes place. Six pages, one table, eight figures, seven references. ("Acta Metallurgica," February 1957, page 77.)

Metal finishing in 1956

Survey of technical developments in metal finishing in 1956 covers cleaning, pickling, polishing, coating, electroforming, corrosion preventives, testing, control, and treatment of wastes. Twelve pages, 421 references, three photographs. ("Metals Finishing," January 1957, page 42.)

Paper-finishing maintenance

Maintenance in the finishing department of a paper mill differs from that of the other departments. Daily, weekly and monthly inspections of rewinders, cutters, trimmers, and supercalenders is discussed. Four pages. ("Paper Trade Journal," December 3, 1956, page 32.)

Valve sizing

In sizing valves one must consider maximum and minimum flow, maximum and minimum pressure differentials, specific gravity, temperature, viscosity, flashing, and rangeability. Four pages, one table, two figures. ("Instrumentation and Automation," November 1956, page 2220.)

Paint solvent evaporation

Equipment available in the average paint laboratory is used for precise determination of comparative evaporation rates of paint solvents. A jolly balance is part of the set-up. Seven pages, 16 tables, 19 figures. ("American Paint Journal Convention Daily," November 14, 1956, page 31.)

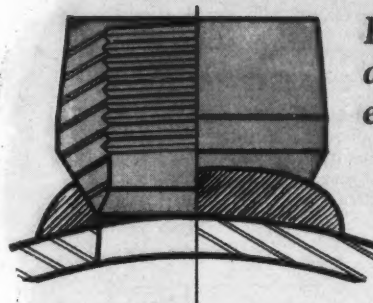
Plastics in construction

Chemical and allied industries can save money by proper selection of plastics as materials of construction. This paper includes performance data for such plastics. Six pages, four tables, seven figures, eight references. ("Corrosion," Dec. 1956, p. 35.)

A New
Line of
Branch

Connections

W-S COUPLETS



Economical
and
easy-to-install

Readily modified
for small diameter
installation



W-S Couplets are designed to function as universal outlet connections for tanks, process vessels and pipelines. They eliminate the need for large, expensive field inventories and costly delays in fabrication.



On most tank, and large piping installations they are used as received. On those few applications where attachment is to be made to a small diameter pipe, the W-S Couplet is easily modified by contouring the welding end with an acetylene torch to mate with the curvature of the pipe. Couplets are made with extra length and heavy wall to permit contouring without detriment to the threaded or socket end.

W-S Couplets are available in sizes 1/4" through 2", with screw-end or socket-welding dimensions . . . also in a 90° elbow.

Send for Bulletin CP-1-57. Write to
W-S Fittings Division, H. K. Porter
Company, Inc., P. O. Box 95, Roselle, N. J.



HKP

W-S FITTINGS DIVISION

H. K. PORTER COMPANY, INC.

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**16-PAGE BULLETIN
SHOWS HOW TO SAVE AIR, GAS, STEAM!**

New, colored, well-illustrated bulletin describes the completely self-contained, self-operated Builders Shuntflo Meter. These direct-reading, easy-to-install meters (for 1" to 24" lines) are installed directly in your pipeline to accurately totalize air, gas, or steam usage.

Send for Shuntflo Bulletin today! **Builders-Providence, Inc., 387 Harris Ave., Providence 1, R. I.**



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J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA

Engineers
ESTABLISHED 1902



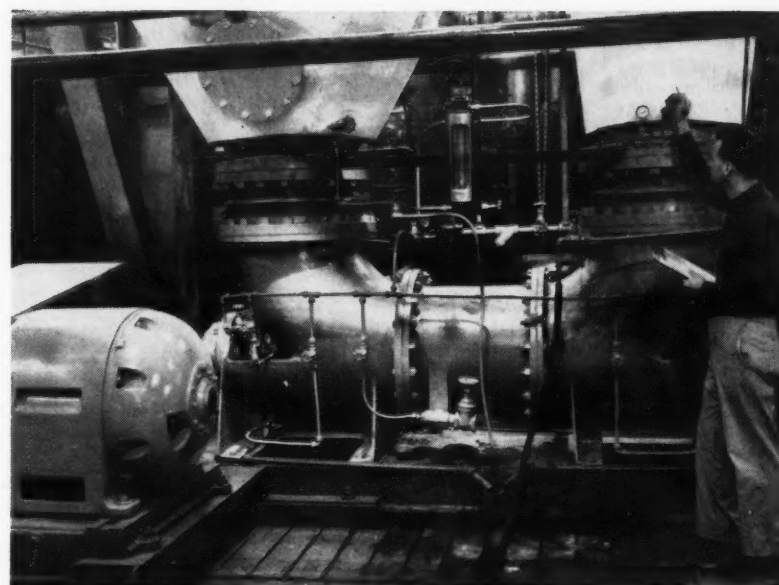
PLANT DESIGN & SURVEYS • CHEMICAL • ELECTROCHEMICAL •
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plant engineering & maintenance—
electrical & mechanical developments

Quadruple-effect Monel evaporators produce salt from 25% brine at International Salt Co. Recirculation of brine, 12,000 to 14,000 gpm, has been continuous and reliable because . . .

**salt-slurry pump
furnishes dependable service**



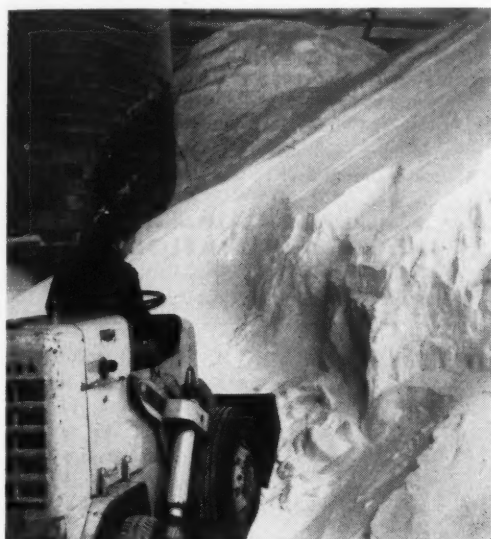
This 24-inch pump recirculates about 14,000 gal of salt slurry per minute



Quadruple-effect Monel evaporators produce salt from 25% brine

Sixteen years of practically continuous service, pumping 12,000 to 14,000 gpm of salt brine 24 hr per day, is the record achieved by a 20-inch axial-flow pump at The International Salt Co.'s, Watkins Glen, N.Y., refinery. Pump is one of four that serves a quadruple-effect Monel evaporator producing salt from 25% brine.

First pump, constructed of stainless steel, was installed in 1941. It pumped continuously until 1951 when it was taken out of service . . . overhauled . . . and placed back in service. Because of first unit's performance, when additional pumping capacity was needed, a second 24-inch pump was installed in 1951 . . . and two more in 1955.



Portion of a 6000 ton indoor mountain of salt at International Salt Co., Watkins Glen, N. Y.

Salt is obtained by hydraulic mining. Clear water is pumped down to the deposit 2000' underground to dissolve salt. Brine that results works its way upward to a natural level 250 ft below surface, and is then pumped to storage tanks. Brine from storage is fed into each Monel evaporator at rate of 60 to 100 gpm. Temperature in number one unit is held at 220°F and decreases progressively to about 90°F in number four. Vapor and steam progress from unit to unit for steam economy. Pressures decrease progressively.

Pumps have casing accurately bored for propeller, and fitted with guide vanes to properly convert velocity produced into pressure. Center cone of guide vanes provides a housing for pump bearing. Propeller is of open screw type modified for best results when handling crystals and balanced both hydraulically and statically. Radial vanes cast on hub of propeller preclude any chance of liquid being

(Please turn to next page)

Sam Spinner's Mail Box



by Sam
Spinner

Dear Sam: We want to remove objectionable particles too small to screen out but large enough to clog a filter quickly. Can you help? (Chemical Company)

Solution: An AT&M Imperforate Basket Centrifugal separated particles and proved easy to clean. The basket was cleaned out by a positive speed unloading drive and plow.

Dear Sam: A noxious slurry containing 20% solids and a small amount of objectionable salts requires separating the mother liquor and removing the salts from the solids.

Solution: Not too complex. An AT&M Perforate Basket Centrifugal spun off the mother liquor, washed away the objectionable salts and spun the solids to the required dryness in an automatically timed cycle.

The objectionable fumes were controlled by a fume type cover. The solids were then easily plowed out by an AT&M unloading drive and discharger.

Send questions to Sam Spinner. If there isn't an answer he'll know. If there is one you'll get it right away.



AT&M Mobile Unit permits centrifugal tests in your laboratory with the materials you use in processing — under your actual working conditions.

Laboratory on Wheels solves problems on the spot

Here's help for any chemical processing plant with a separating problem.

AT&M now sets up a laboratory in your plant. Here it can be certain that the conditions and materials will be identical to those of the actual processing. It can be determined on the spot whether an AT&M centrifugal can solve the problem.

AT&M centrifugals are widely used in Separation, Dehydration, Coating, Filtering, Impregnation and Sedimentation processes.

New models make maximum use of time and space, with top safety. Send coupon for data.

AMERICAN TOOL & MACHINE COMPANY
1423 Hyde Park Ave., Boston 36, Mass.

Please send me my free copy of the new AT&M booklet "Centrifugal Force." I am interested in the following processes:

Separation ☐ Extraction ☐ Dehydration ☐ Clarification ☐
Coating ☐ Filtration ☐ Draining ☐ Thickening ☐ Impregnation ☐
Sedimentation ☐



SAVE TIME, SPACE
AND COSTS WITH

A.T. and M.
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Name.....Title.....

Company.....

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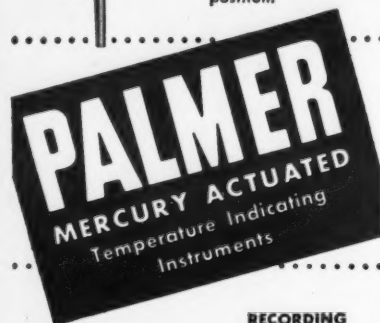
City.....Zone....State

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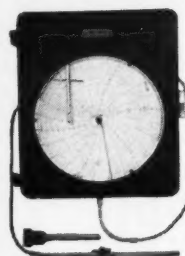


4 1/2" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.



RECORDING THERMOMETERS



Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 + 950°F For Equivalent in °C.

INDUSTRIAL THERMOMETERS

Red-Reading Mercury — Extruded brass case — chrome finish. Ranges —40 + 950°F or Equivalent in °C.

RED-READING MERCURY LABORATORY THERMOMETERS

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

WRITE FOR CATALOG
INFORMATION



When inquiring check 3585
opposite last page

ENGINEERING & MAINTENANCE

Salt-slurry Pump

(Continued from preceding page)

pumped working into bearing. Stuffing boxes are part of discharge and suction elbows and are designed for ample packing to insure tightness without undue pressure on the gland. Shaft is encased in a tube for protection against action of material being handled.

(Axial-flow pumps were supplied by Morris Machine Works, Dept. CP, Baldwinsville, N.Y. . . . or for more information check 3586 opposite last page.)

(Monel evaporators are a product of Swenson Evaporator Co., Subs. of Whiting Corp., Dept. CP, 15613 Lathrop Ave., Harvey, Ill. . . . or for more information check 3587 on form opposite last page.)

Zero pressure drop, no leakage under extreme temperatures with motor operated valve

Uses: Unit is designed for high pressure control functions such as handling liquid oxygen, hydraulic fluids, and high pressure pneumatics.

Features: Valve gives zero pressure drop and zero leakage under operating temperatures ranging from —320 to 350°F.

Description: Motor-operated shut-off valve has ball valve design. Ball surface and seat faces are always in sealing contact, preventing wear-producing shocks and poundings present in conventional valves. In open position, flow passes straight through axial hole in ball. Operating pressures are up to 3000 psi.

(Motor-operated shut-off valve is product of Hydromatics, Inc., Dept. CP, Cedar Grove, N.J. . . . or for more information reader may simply check 3588 on the convenient Reader Service slip which is located opposite last page.)

Data on forged steel unions for high pressure service

Dimensional and engineering data on complete line of forged steel unions for high pressure service are presented in eight-page bulletin. Bulletin describes unions designed to AAR dimensional specifications in 3000-lb class, 2-bolt and 4-bolt flange unions in 2000- and 3000-lb classes, 3000-lb O-ring flange unions, orifice unions, and others.

Bul U-1-56 is issued by W-S Fittings Div., H. K. Porter Co., Inc., Dept. CP, PO Box 95, Roselle, N.J. When inquiring reader may simply check 3589 on the convenient Reader Service slip which is located opposite last page.

NEW PATENTED, WATER-CONDITIONER KE-TONE®

removes scale, inhibits corrosion



KE-TONE — "Makes Water Work"

KE-TONE is a new and unconventional method for solving water-caused scale and corrosion problems. Developed from recent research in chelate and surface chemistry, it works by surface adsorption to fracture, suspend and dissolve scale. Only a few parts per million are needed to activate large volumes of water.

KE-TONE is highly efficient, extremely economical and performance-proved in the treatment of large or small volumes of water used in cooling towers, evaporators, boilers, heat exchangers and other industrial or commercial systems.

Outline your scale problem and send for Technical Bulletin on KE-TONE today. Ask for quote on 5 or 10 gal. Trial Drum.

*Composition and Methods Patented

UNITED CHEMICAL CORPORATION
OF NEW MEXICO, HOBBS, NEW MEXICO

When inquiring check 3590 opposite last page



SEND FOR FUSED QUARTZ—FUSED SILICA
DATA FILE



CENTER FOR HIGH-PURITY FUSED QUARTZ

The Amersil processes for producing and fabricating fused quartz and silicaware of critical purity, simplify your problems in securing the precise laboratory or industrial equipment required for your production.

Standard apparatus, crucibles, trays, cylindrical containers in a complete range of sizes and tubing (up to 25" diam.) are available for early delivery. Amersil engineers are available to assist in developing special equipment to individual requirements. Your inquiry is invited. ★ ★

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ENGELHARD INDUSTRIES

When inquiring check 3591 opposite last page

CHEMICAL PROCESSING

Bends 8" or larger pipe up to 90° . . .

actual bending time with 2
hp motor is 3 min

Uses: For bending pipe in
field.

Features: Unit can bend 8"
and larger size pipe up to 90° in
single setting.

Description: Using 2-hp mo-
tor, actual bending time for 90°
bend on 8" pipe in field is 3 min.
Device can also be operated with
½-hp electric motor or gasoline
engine. Frame folds together on
top of hydraulic ram. Attachment
for making 180° bend in one set-
ting for all pipe sizes is available.

(Tal One Shot mobile pipe bender
is product of Tal Bending
Equipment, Inc., Dept. CP, Mil-
waukee 2, Wis. . . . or for more
information check 3592 on form
opposite last page.)

Anion exchange resin described

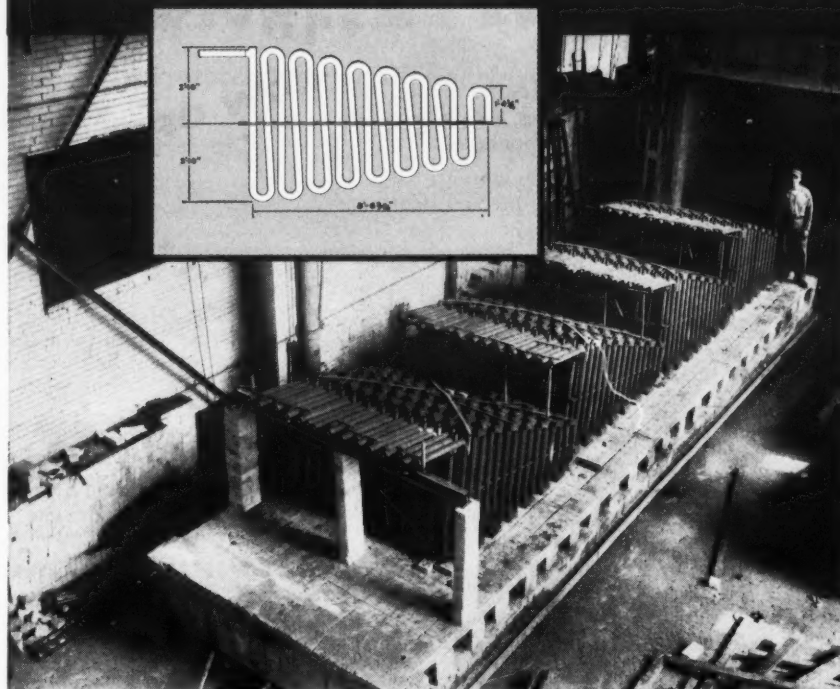
Properties and behavior of an-
ion exchange resin for water
demineralization are described
in 12-page data leaflet. Pages
are suitable for insertion in
loose-leaf binder. Summary of
properties and characteristics is
presented in tabular form. Other
tables show typical screen anal-
ysis and expected range, bed
expansion vs backwash flow
rate, and effect of total dissolved
solids on capacity. Graph charts
typical performance of resin
throughput vs specific conduct-
ance.

Duolite Data Leaflet 35 is is-
sued by Chemical Process Co.,
Dept. CP, PO Box 829, Red-
wood City, Calif. When inquir-
ing specify 3593 on form oppo-
site last page.

For more information on prod-
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MIDWEST PIPE COILS

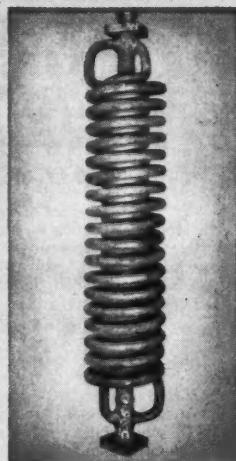
Meet the MOST EXACTING Specifications



FULL FURNACE ANNEAL

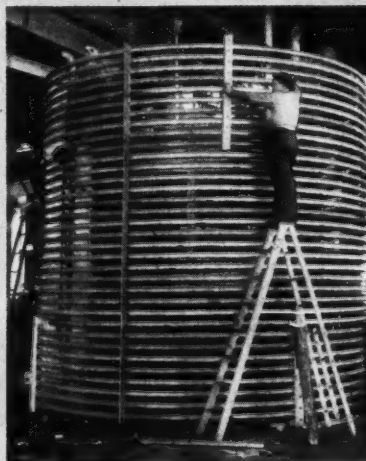
Furnaces of giant size enable us to anneal large
coils under closely controlled conditions. Shown
here is set of 48 kiln cooling coils 2½" OD x

165" wall bent on 6" centers with maximum
reduction of ¼" on OD. Material is 7% Cr—
½% Mo.



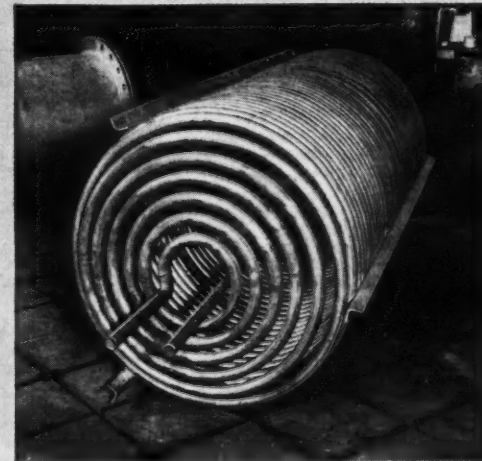
DOUBLE COIL

Diameter of inside coil is only 8"
while outside is 14". Made of 1½"
OD x 1½" ID 4-6% Cr—½% Mo
tubing and full furnace annealed.



304 STAINLESS-SANITARY FINISH

Double cylindrical coil of 3" OD by 14 gauge, Type 304
stainless steel. All welds ground to sanitary finish.



KETTLE COIL

Made of 1" Schedule 40—316 ELC. Finished coil was heated to
1950°F and water quenched.

Do you need coils

- . . . that are full furnace annealed
- . . . of intricate design
- . . . to comply with codes
- . . . with bends to close centers
- . . . to accurate dimensions
- . . . made of stainless steel or other
corrosion resistant or heat resistant
pipe?

We make coils of any size, shape or con-
tour . . . of any pipe which can be bent
and welded. Equipment includes the most
modern bending and coiling machines . . .
furnaces large enough for full furnace
anneal. Welding and coiling techniques
are the most advanced, developed
through long experience.

Here are just a few of the types of
coils we make regularly. Send us your
specifications.

7677

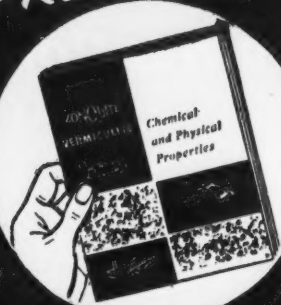
MIDWEST PIPING COMPANY, INC.

Main Office: 1480 South Second St., St. Louis 4, Mo.
PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

SALES OFFICES:

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GET THIS
FREE BOOK!



The Book You'll Want For Ready Reference!

Newly published technical data covering Zonolite vermiculite's "physical and chemical properties"—the wide range of information you need to fit this versatile mineral into your manufacturing and processing pattern.

Tells New and Tested Uses for the WONDER MINERAL VERMICULITE

Product of Zonolite Company

Zonolite vermiculite is the remarkable mineral with many unique characteristics of interest to research men, designers, and product developers. New book describes chemical and physical properties. Countless uses, including:

- Fertilizer conditioner
- Carrier of insecticides, herbicides, fungicides, fumigants
- Cushioning material
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- Insulation of household appliances
- High temperature insulating cements
- Additive in paints, other products
- ...and many more

Zonolite vermiculite, readily available from our 40 plants is a granular crystalline mineral of low density. Possesses high thermal and absorptive properties, and is available in a wide range of particle sizes. Send today for free book and inspection sample.

ZONOLITE COMPANY
135 So. La Salle St., Chicago 3, Ill.

Zonolite Company, Dept. CP-57
135 So. La Salle Street, Chicago 3, Ill.
☐ Please send me my free copy of your ready-reference book, "Zonolite Vermiculite Chemical and Physical Properties."

☐ Please send sample of processed vermiculite.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

When inquiring check 3595
opposite last page

ENGINEERING & MAINTENANCE

**Designed for unrestricted flow —
compact, packless, valve
has Teflon diaphragm . . .**

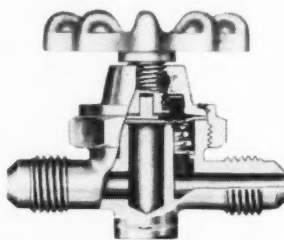
assures long life and tight sealing action under variety of operating conditions

Uses: Recommended for refrigeration service, charging boards, gage shut-off valves, vacuum applications, and other small-valve applications.

Features: Valves are designed for unrestricted flow. Teflon diaphragm assures long life and tight sealing action under all conditions of operation.

Description: Lightweight, forged brass valves are available in 1/4" through 3/8" flare and ODS sizes, and can also be furnished with other types of end connections. Valves have full capacity ports with inlet and outlet ports-in-line, non-rotating floating bearing plate, stainless steel spring, and hexagonal wrench grip on valve bonnet.

(Diaphragm packless valve is manufactured by Henry Valve Co., Dept. CP, 3215 North Ave., Melrose Park, Ill. . . . or for more information check 3596 on form opposite last page.)



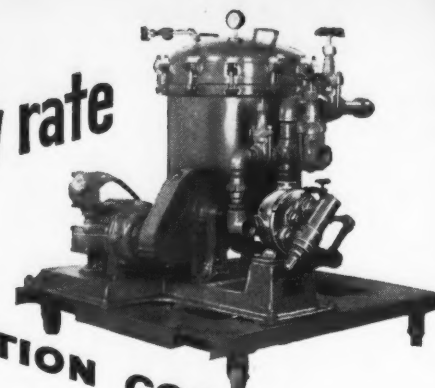
Compact, packless valve has
Teflon diaphragm



"This isn't exactly what I had in mind
when I requested another stripper."

HIGH Flow rate

LOW OPERATION COST



WITH VIKING PUMPS

Sparkler Manufacturing Company, Mundelein, Illinois, assures high quality performance, high flow rate, and low operation cost by including Viking Pumps as original equipment on their horizontal plate filters for clarifying resinous coatings.

Filters range in capacity from 300, 500, 700, 1000, 1400, 1700, 2000 and 3000 gallons per hour, and Viking pumps are available in the sizes required to meet all of these capacities.



Vikings are adaptable to many pumping requirements—perhaps yours, too. For information, write for Bulletin 57Sec.

VIKING PUMP COMPANY Cedar Falls, Iowa, U.S.A.

In Canada, it's "ROTO-KING" pumps

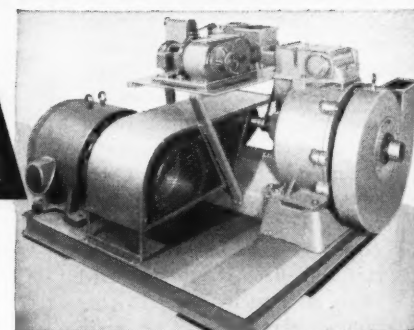
THE ORIGINAL "GEAR-WITHIN-A-GEAR" ROTARY PUMP

When inquiring check 3597 opposite last page

Do You Need ULTRAFINE GRINDING?

FOR UNEXCELLED QUALITY WITH
CONTROLLED PARTICLE RANGE

use a
**SCHUTZ-O'NEILL
PULVERIZER**



Backed by 63 years experience!

If your product must be pulverized to ultrafine specifications and yet have controlled particle size distribution, you'll find proven Schutz-O'Neill "Superfine" Pulverizers best for the job.

Many products that are heat sensitive can be pulverized safely too, because the grinding principle of impact with air attrition keeps product temperatures down and helps control humidity.

Versatility of the Superfine Pulverizers makes them adaptable to the complete range of grinding from coarse to ultrafine. Schutz-O'Neill Superfine Pulverizers are used in the paint industry where ultrafine pigments with close particle size range are

vital; by major cocoa powder, sugar, spice and pharmaceutical manufacturers; for emulsifier gums, resin, plastic and seaweed extract powders—wherever unexcelled quality grinding is required. Offered in 6 sizes ranging from 7 1/2 to 125 HP with grinding chambers 12" to 28" in diameter.

FREE TEST GRIND OF YOUR PRODUCT in our test lab! Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired. You'll receive back your processed product plus our Engineering Test Report—there's no obligation.

Send for literature on
Schutz-O'Neill Pulverizers



SCHUTZ-O'NEILL COMPANY

343 Portland Avenue • Minneapolis 15, Minnesota

When inquiring check 3598 opposite last page

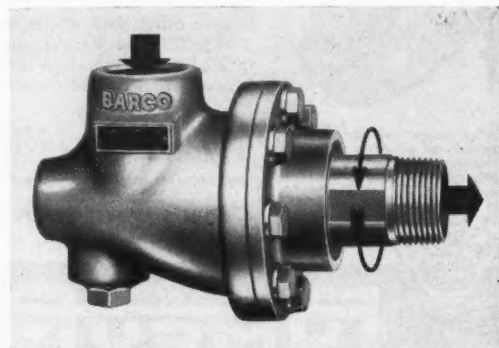
CHEMICAL PROCESSING

Designed to simplify selection, rotary joint offers wide range of service . . .

suitable for steam pressures from 0 to 200 psi, 0 to 400 psi hydraulic, temperatures to 500°F

Uses: For attaching air, steam, water, oil, or gas lines to rotating drums, dryers, or rolls.

Features: Unit is designed to simplify selection specifications by being suitable for pressures from 0 to 200 psi. steam, 0 to 400 psi hydraulic,



Compact rotary joint suitable for variety of services

for temperatures to 500°F, and for any ordinary rotating speed. Joint has low starting and running torque at high pressures.

Description: Bearings and seal of joint are self-lubricating. Seal is self-adjusting for wear, eliminating need for periodic take-up on packing or stuffing box. Joint is produced in eight standard sizes from 1/2 to 3". Overall length ranges from 5 7/8" in 1/2" size to 12 3/4" in 3" size. Body is malleable iron with heat-treated steel, rotating shaft. Unit is available with right- or left-hand thread on shaft.

(Type-C rotary joint is product of Barco Mfg. Co., Dept. CP, Barrington, Ill. . . . or for more information check 3599 on form opp. last page.)

Guide for selecting valves, liquid gages, lubricators

Indexed for easy reference, 24-page guide details information on selection of valves, liquid gages, and lubricating devices. Technical data are listed on check, gate, globe, needle, and relief valves. Tables show how to determine total temperature of superheated steam, and how to determine pipe sizes. Cost-of-leakage table for air, steam, and water is included.

Cir 555 is issued by Lunkenheimer Co., Dept. CP, Box 360, Cincinnati 14, Ohio. When inquiring check 3600 on form opp. last page.

CHILDERS JACKETING

Protects Your Insulation Investment



EASILY INSTALLED with only a screwdriver and a wedge. Inexpensive strapping holds Childers Jacketing securely, yet permits easy removal for inspection of the lines. Same jacketing can then be reapplied without waste.

...safeguards insulation on process lines in thousands of refineries and chemical plants

It's a fact that you benefit from world-wide experience when you protect costly insulation on lines, towers, vessels and tanks with Childers Aluminum Jacketing. More than 2,000 petroleum refining, petrochemical and chemical plants endorse your decision to use Childers Jacketing.

Childers' experience in protecting insulation has provided the most complete line of permanent-type weatherproofing offered today. Five weights of aluminum are available. In addition, time-saving Lap Seal

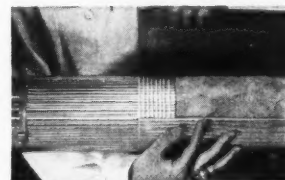
(patent pending), factory-attached moisture barrier and rolled-in cross-corrugation give superior protection and reduce costs.

The initial cost is lower for Childers Jacketing than any other permanent weatherproofing...even lower than some temporary coverings. But the biggest savings are in the maintenance-free years following installation. Costly insulation is effectively protected against weather damage and physical abuse.

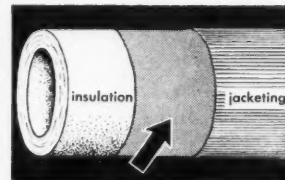
Improved appearance of your plant

and easier "housekeeping" are "plus" benefits of Childers Aluminum Jacketing.

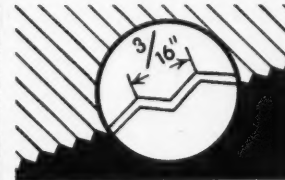
Childers Engineering Representatives give professional advice on insulation jacketing in all major industrial centers. Send for a free sample of jacketing, engineering data on how to safeguard your insulation and the name of the Childers Engineering Representative near you. Write Childers Manufacturing Co., Dept. CP-15, P. O. Box 7467, Houston 8, Texas.



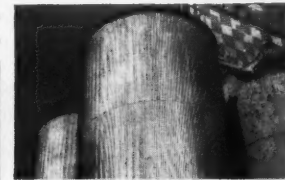
LAP SEAL, available at no extra cost, is a series of 8 ribs rolled into the overlapping edge of the jacketing, providing an automatic measure of the 2" circumferential lap. Proper lap is insured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap Seal and a mastic.



FACTORY-ATTACHED MOISTURE BARRIER protects the underside of aluminum from possible attack by alkaline solutions present in most insulating materials. The moisture barrier, bonded at the factory by continuous strip adhesive, adds little to cost, saves application labor, insures against underneath corrosion.



TESTS PROVE EXTRA STRENGTH of rolled-in 3/16" cross corrugation. Vertical strength and rigidity of a .016" sheet with this 3/16" cross corrugation are increased to that of a plain .024" sheet. Jacketing costs are consequently reduced by as much as 1/3 when Childers Jacketing is used instead of ordinary sheet aluminum.



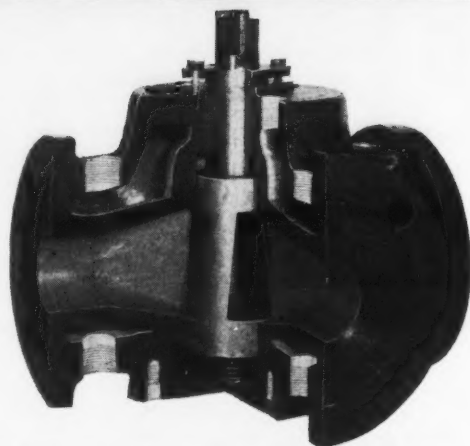
DEEP CORRUGATED Childers Jacketing in 1/4" and 2 1/2" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels and tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.

When inquiring check 3601 opposite last page



Jacketed Spring Loaded PLUG VALVES

- 2-WAY OR STRAIGHT SPRING LOADED
- 3-WAY SPRING LOADED
- ANGLE SPRING LOADED
- AIR CYLINDER OPERATED SPRING LOADED—all sizes and types



LONG ON SERVICE... SHORT ON MAINTENANCE

H & B's new fully jacketed spring loaded plug valves feature an inverted tapered plug inserted and lapped into the housing from the bottom of the valve—then spring loaded. The spring wedges the plug to a perfectly tight seal, eliminating troublesome leaks. Easy to operate—no big handwheel... no freeze... no "breaking loose" necessary. Easy to clean. Made in two port or multi port design, with any special stop arrangement desired.

Bulletin J-57 sent on request

HETHERINGTON & BERNER INC., 711 Kentucky Ave., Indianapolis 7, Ind.

When inquiring check 3602 opposite last page

Binks spray nozzles

for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.

You'll get the right nozzles quicker by calling Binks... manufacturers of one of the most complete selections ever produced.

There is a size and spray pattern for every purpose... with nozzles cast or machined from standard or special corrosion-resistant metals and materials.

MAIL COUPON
NOW!

Binks

A COMPLETE LINE OF
INDUSTRIAL SPRAY NOZZLES
AND COOLING TOWERS



Binks Manufacturing Company
3120-32 Carroll Ave., Chicago 12, Ill.
O. K. Binks, send me your comprehensive Spray Nozzle Catalog without obligation.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

When inquiring check 3603 opposite last page

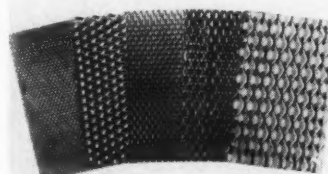
ENGINEERING

**Metal mesh offers
variety of shapes,
plus strength, safety...**

available with openings
from 1/16 to 2 1/2"

Uses: For metal mesh decorative and structural uses.

Features: Mesh is reported to be stronger, safer, and more decorative than other materials used for similar purposes. It can be produced from any standard sheet material.



Standard or flattened metal mesh has wide variety of decorative and structural uses

Description: Metal mesh is available with openings from 1/16 to 2 1/2". Mesh is offered in variety of shapes, gages, openings, and strand widths. Mesh openings can be varied from infinity up to over 90% daylight. Metal gages as low as .008" can be supplied. Weight is as much as 90% less than nominal sheets of same material.

(Micromesh is product of Designers Metal Corp., Dept. CP, 440 E. 159 St., Harvey, Ill. . . . or check 3604 opposite last page.)

Condensed technical data on steel pipe, tube

Technical bulletin of four pages presents condensed data on fabrication, heat treatment, and maximum allowable working pressure for steel pipe, tube, and fittings. Tables list mechanical and physical properties.

Tech Data Card 152-A is issued by Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. When inquiring specify 3605 opposite last page.

BETTER PERFORMANCE

- Less slippage
- Longer life



Try Darcova Puncups in your reciprocating pumps and cylinders, and you too will realize what a big difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time!

Get all the facts

Send today for helpful Bulletin No. 5588.

Puncup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder requirements.



DARLING VALVE & MANUFACTURING CO.
Williamport 4, Pa.

TRADE MARK
Puncups

When inquiring check 3606 opposite last page

IS CORROSION ATTACKING YOUR ELECTRICAL RACEWAYS?



New Free Booklet gives facts on how Republic "Dekoron-Coated" E.M.T. can eliminate this problem

Complete with how-to-install pictures, new illustrated booklet gives full information on sizes, properties and engineering data of Republic "Dekoron-Coated" E.M.T. and Rigid Steel Conduit—the polyethylene covered raceways that shrug off corrosion. Add life to your wiring systems and save money. This interesting booklet (DEK-3) will show you how. Write to:

REPUBLIC STEEL

STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio



When inquiring check 3607 opposite last page

CHEMICAL PROCESSING

**'Universal-joint' action
gives high efficiency
to pump . . .**

positive-displacement unit
has self-lubricating bearings

Uses: For pumping aromatic liquids or any other petroleum product.

Features: "Universal-joint" action provides high operating efficiency. Bearings are self-lubricating.

Description: Rotary positive-displacement pump is available in capacities from 25 to 300 gal./min. Radial-thrust ball bearings and outboard-thrust collars protect pump against power take-off thrust and pre-loads.

(Type "A" pump is product of Granberg Corp., Dept. CP, 1308 67th St., Oakland 8, Calif. . . or for more information check 3608 on form which is located opposite last page.)

**Sealed power rectifier
impervious to damage
from corrosives**

Uses: Unit is designed for paper mills that make their own chlorine.

Features: Reported to be impervious to damage from corrosive atmospheres, unit can be placed alongside processing vessels, eliminating need for costly "distant installations".

Description: Rectifier uses either germanium or silicon semiconductors. It incorporates advantages such as water-cooled heat exchanger, overload protector, and hermetically sealed cells.

(Rectifier is product of Sel-Rex Corp., Dept. CP, Newark, N.J. . . or for more information check 3609 on form which is located opposite last page.)

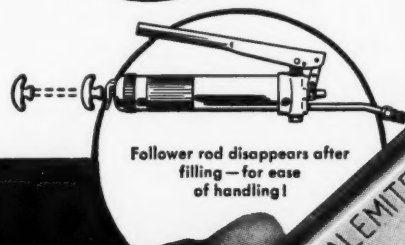
For more information on product at right, specify 3610 . . . see information request blank opposite last page.

10,000 LBS. OF POWER

for even ordinary lubrication jobs!

FAST, EFFICIENT HEAVY-DUTY ALEMITE HAND GUNS

This rugged Alemite lever-type gun is packed with power and superior features for super performance in industrial lubrication! Develops 10,000 lbs. pressure . . . more than enough for ordinary lubrication jobs—with plenty of reserve power for "tight" bearings! Handles all regular pressure gun greases. Long-operating handle for maximum leverage. Loader fitting permits fast, clean filling (or gun may be filled by suction). Capacity, 1 lb., outlet, 1/8" p.t.



Heavy-duty Lever Gun
Model 1036-SE



**Complete line of
adapters and hose for all
types of fittings!**



STEWART
SW
WARNER

ALEMITE

Division of STEWART-WARNER CORPORATION

Mail Coupon for FREE Catalog!

Alemite, Dept. K-57, 1850 Diversey Parkway
Chicago 14, Illinois

Please send me your complete catalog on Alemite lubrication equipment for industry.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

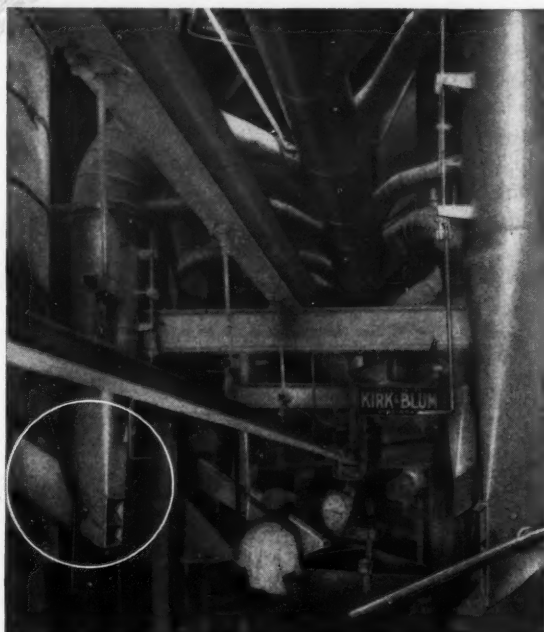
KIRK & BLUM

DUST CONTROL SYSTEM

saves power through automatic orifice selection

Top portion of each chute serves as dust control inlet orifice. Dust is removed **before** it can reach batch area.

Each individual dust collection port is designed to be automatically opened by monorail batch car when it stops at particular silo. Closes automatically when car leaves.



COMPANY: The Chas. Taylor Sons, Co., Cincinnati, O., a Subsidiary of National Lead Co., manufacturers of special refractories.

PROBLEM: Dust collecting system for batch mixing area containing 7 silos of refractory grain which feed by chute into monorail batch car as it passes down line.

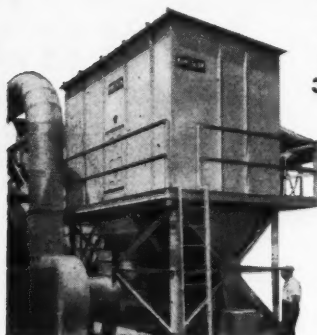
SOLUTION: Kirk & Blum system assures just the right balance to remove light dust without stealing usable product.

Ingenious damper arrangement conserves air, assures highest system efficiency. No silo dust collection port is open except when its chute is operating.

Let Kirk & Blum—with 50 years experience—solve your intricate dust collection problems.

Write today for detailed information.

THE KIRK & BLUM MFG. CO.
3133 Forrer St., Cincinnati 9, Ohio



10,000 C.F.M. dust arrestor located outside saves space. Collected dust moves to central disposal point by screw conveyor.

When inquiring check 3611 opposite last page

ENGINEERING & MAINTENANCE

Concrete water absorption reduced 75 percent . . .

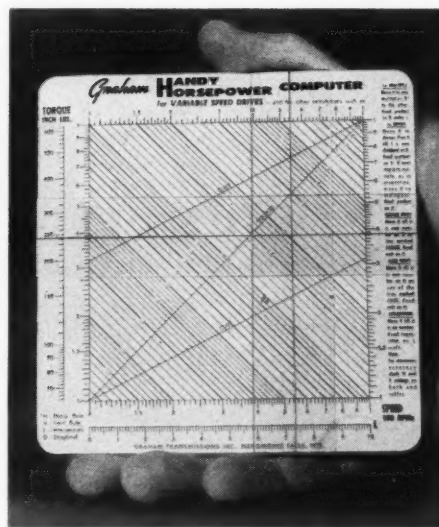
silicone-based repellent reduces penetration of calcium salt solutions

Uses: Water repellent for protecting concrete constructions from spalling.

Features: Twenty-four hour immersion tests of concrete treated with repellent show that amount of water absorbed is reduced by 75 percent. Penetration of calcium salt solutions is also reduced.

Description: Silicone-based water repellent is shipped in form of concentrate, which is diluted to proper application strength by mixing with 54 parts of mineral spirits. It may be sprayed on, in dry weather, at any time of year, provided temperature is not below 15°F.

(Spallbar water repellent is available from Silicones Div., Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 3612 on form opposite last page.)

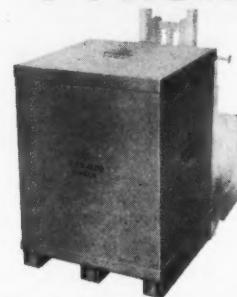


Numbers game

Handy 4 3/4" square computer permits rapid solution of any formula involving two variables, raised to any power or root, and a constant. Companion booklet, "Fascination in Numbers" explains computer's principles and introduces reader to "The Peasants of Auvergne", "Six Appeal", and others.

Computer and booklet are available from Graham Transmissions Inc., Dept. CP, Menomonee Falls, Wis. When inquiring specify 3613 on form which is located opposite last page.

TITAN T-PACK



SELF-PALLETIZED
EXPENDABLE

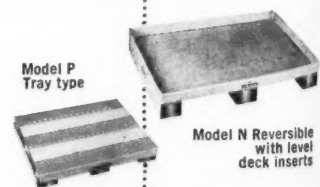
TOP ECONOMY
and
EFFICIENCY

. . . in handling and shipping bulk and granular products.

The TITAN T-PACK is internally braced . . . 1-ton capacity (or less, if desired) . . . unequalled for convenient, simplified, low-cost warehousing, handling and shipping of bulk chemicals, salts, granulars, powders and the like.

- ELIMINATES bags and pallets.
- REDUCES loading, sealing, handling costs.
- STOWS compactly in rows 3 wide and 2 high in boxcars — 2 wide and 2 high in trailers — utilizing all space for efficient loading.
- PURCHASED knocked down, for easy, economical storage and assembling.
- UNLOADS by means of vacuum, tipping bin or bayonet in bottom.

The T-PACK provides all the famous features that have made TITAN Expendable Palletization unmatched for saving time, money and work, from loading to delivery. There's a TITAN expendable product for every need.



For more details, write

TITAN

TITAN PALLET CO., INC.
527 Madison Avenue, 22 New York, N. Y.

*Keystone to modern shipping

TM Reg. — Pats. Pend.

When inquiring check 3614
opposite last page

CHEMICAL PROCESSING

**Instant and permanent sealing
of pipe connections obtained
with Teflon insert . . .**

holds seal under pressures of 10,000 psi and temperatures from -200 to 500°F

Uses: Device for sealing leaky pipe connections.

Features: Chemically-inert, temperature-resistant Teflon insert holds seal under pressures of 10,000 psi and temperatures from -200 to 500°F.



Self-sealing pipe fitting requires no special tools

Description: Thin, nut-like metal fitting has dry, white circular insert. It can be screwed on standard metal pipe by hand. Fitting is available in sizes from 1/8 to 2 1/2".

(Tru-seal fitting is product of Tru-Seal Div., Flick-Reedy Corp., Dept. CP, Melrose Park, Ill. . . . or for more information check 3615 on form opposite last page.)

**Pump design provides 100% filtration
for cleaning hydraulic fluid . . .**

unit is equipped with purolator-type micron filter

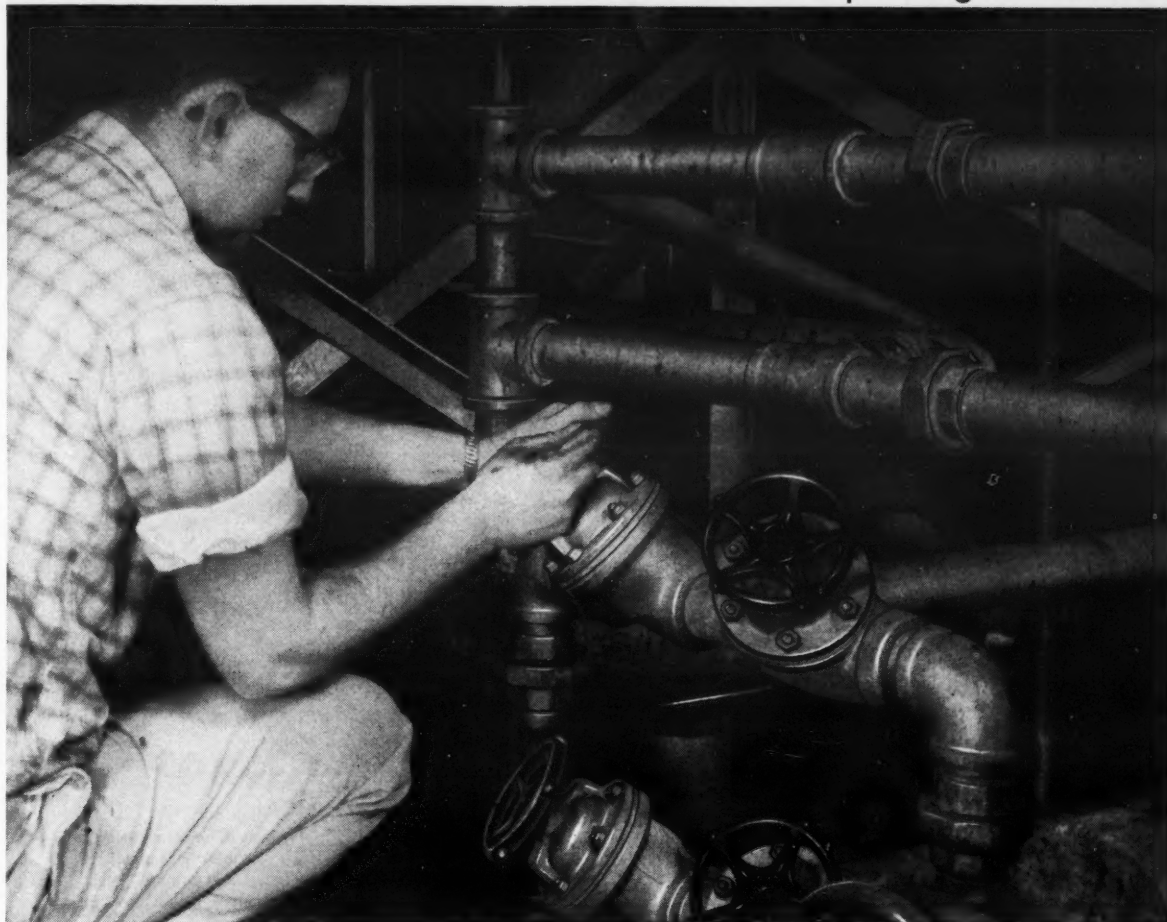
Uses: Pump is designed for heavy duty, continuous 3000 to 5000 psi, hydraulic fluid operation.

Features: Unit has built-in filter that provides 100% filtration to fluid being handled.

Description: Capacities of constant displacement pump at 3000 psi range from one to five gpm, depending on size and rpm of driving motor. Pump is suitable for use on equipment involving high static loads over long periods under adverse conditions. Filtration is accomplished with purolator-type micron filter.

(Constant displacement pump is product of Oilgear Co., Dept. CP, 1560 W. Pierce St., Milwaukee 4, Wis. . . . or for more information check 3616 on form opposite last page.)

Another satisfied user of Crane Diaphragm valves



Best by test for this heavy, sticky emulsion —Crane diaphragm valves

What valve is best and lasts longest in this service? A West Coast emulsified asphalt producer tried them all on the manifold above and here's what was found.

Conventional valves would become inoperative in a short time. The main trouble was binding of the stem in contact with the cold, heavy asphalt emulsion.

Ordinary diaphragm valves on the same service lasted only two months and had to be replaced. The diaphragms didn't stand up and the high torque required for closure was impractical for frequent operation.

Three years ago the plant started using

Crane No. 1610 Packless Diaphragm Valves. The neoprene diaphragm functions only to seal the bonnet. It is not subject to crushing and excessive wear as a seating member. The separate disc in combination with Crane Y-pattern body makes positive closure with minimum torque and turns. These valves are giving full satisfaction.

Literature on Request

Wide choice of body and diaphragm materials makes these exclusive Crane valves particularly useful to process industries. Ask your Crane Representative for Circular AD-1942, or write to address below.



CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

When inquiring check 3617 opposite last page

**Tomorrow's
MODERN DESIGN
for
Today's Demands!**

MORRIS PUMPS

**keep the aluminum industry rolling toward
GREATER CAPACITY**

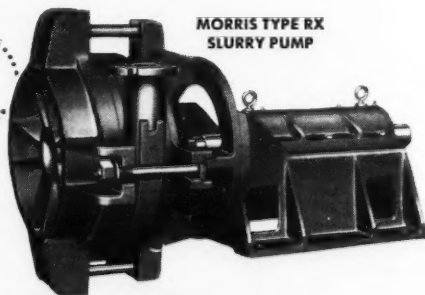
In pace with the far-sighted aluminum industry, other leading manufacturers the country over shrewdly specify Morris for heavy duty pumping.

The Morris Type RX Slurry Pump is rugged, dependable, and trouble free. It's specifically designed for heavy pumping; gives peak performance under all conditions, including heavy, coarse or fine slurries, dispersions and sludges.

The Morris pump operates with minimum attention . . . lowers maintenance costs . . . can be quickly dismantled for inspection . . . avoids lengthy lay-up time. For heavy duty pumping . . . specify Morris.

WRITE TO MORRIS TODAY for recommendations of the pump best suited to your size, capacity, specifications. Ask for Bulletin 185.

MORRIS
CENTRIFUGAL
PUMPS

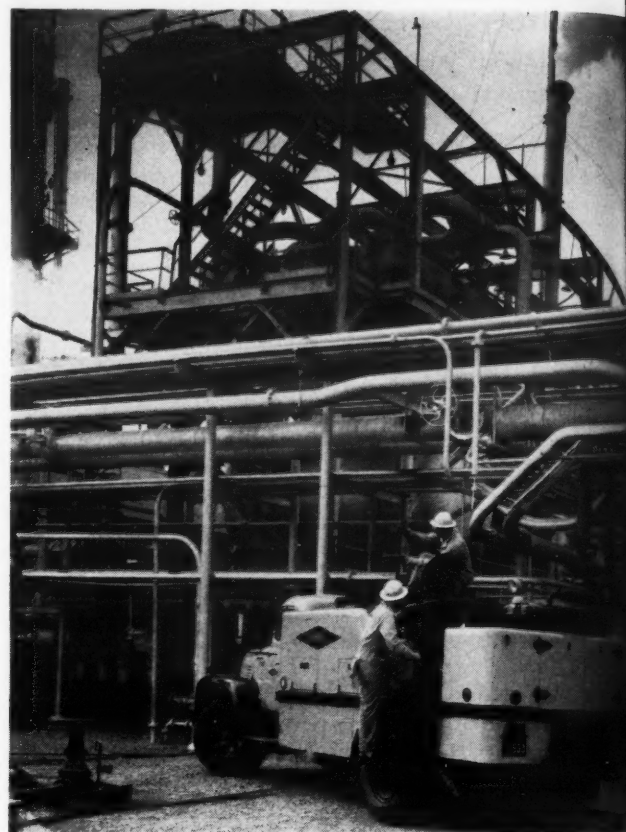


MORRIS TYPE RX
SLURRY PUMP

MORRIS MACHINE WORKS

Baldwinsville, N. Y.

Sales Offices in Principal Cities



Typical chemical-cleaning operation in a plant

**Chemical cleaning of three Dowtherm boilers
to remove mill scale —**

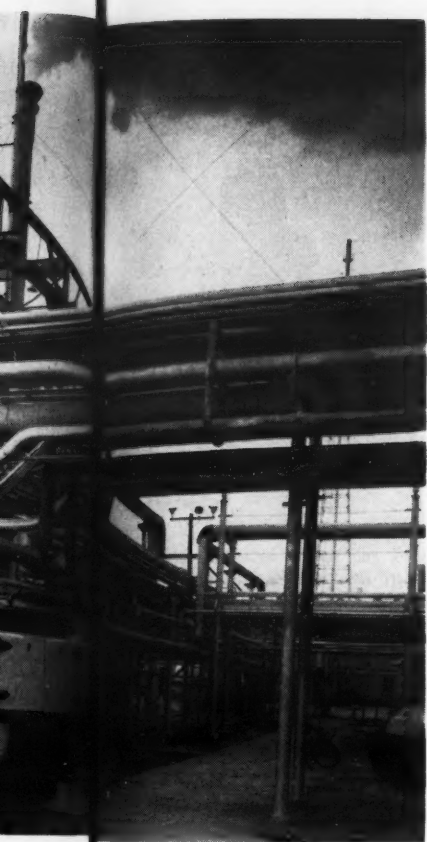
prevents COSTLY maintenance

GORDON WEYERMULLER, Associate Editor
With **R. A. BENZAQUIN**, Chemical Division
Celanese Corporation of America
Point Pleasant, West Virginia

Problem: Damage from mill scale was probable unless it was removed from three Dowtherm boilers to be placed in operation at the Point Pleasant plant of Celanese. Boilers were to be used to furnish heat for the vacuum distillation of tricresyl phosphate. Units are completely automatic off-on boilers which fire a sufficient portion of the time to hold a preset

pressure in the still jackets.

Since Dowtherm is a good descaling agent, it was felt that any mill scale in the units would eventually be loosened during operation and end up lying on the bottom tube sheet. This would probably result in overheating and buckling of the tube sheets. Hence, removal of mill scale was required prior to startup.



Solution: Corrosion and Inspection Group at the Bishop plant of Celanese recommended that the Dowtherm units be acid-cleaned for removal of mill scale. Accordingly, the units were chemically cleaned with inhibited hydrochloric acid in April 1956. Inhibition of the acid prevents excess removal of metal from inner surfaces of unit.

Cleaning operation required 750 gal of 15% inhibited acid. Each boiler, with its lines, was cleaned as a separate operation. Each unit was heated to 175°F with hot water, filled with 7½% acid at 160°F, and allowed to soak for four hours. Unit was then drained, flushed, and allowed to stand. Total area cleaned of mill scale was about 1000-1200 sq ft. Personnel and equipment arrived at the plant at 8 AM and left at 4 PM.

Results: Units have given no trouble to date. It has not been necessary to open boilers for inspection since they have been in operation. Units are expected to give good service for many years with only minimum maintenance.

(Boilers were chemically cleaned by Dowell Incorporated, Dept. CP, P.O. Box 536, Tulsa, Okla. . . or for more information check 3619 on form which is located opposite last page.)

New Carrier ~~NATURAL-FREQUENCY~~ Conveyors now offer higher capacity with greater dependability

90% of the operating power
is supplied by leaf springs of

SCOTCHPLY®
BRAND

REINFORCED PLASTIC

Low first cost and high conveying speed (up to 90 feet per minute) are only two of the reasons why Carrier "Natural-Frequency" Conveyors are the choice of more and more engineers.

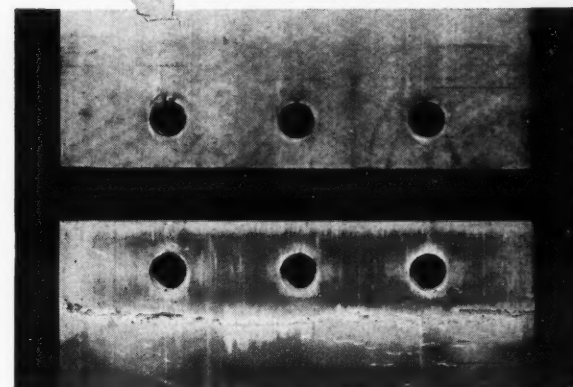
An eccentric drive puts the trough into motion to move loose bulk materials by a series of high frequency "pitches and catches". This means screening and sizing can be done while conveying. Troughs may be covered for dust-proof construction. And drive stresses are distributed uniformly along the whole length of the conveyor by cantilever-type leaf springs.

Choosing the leaf-spring material was no easy job. Carrier tested steel, resin impregnated laminated hardwood and other reinforced plastic materials. They found only "SCOTCHPLY" Reinforced Plastic answered every requirement: strength, resistance to fatigue and corrosion.

"SCOTCHPLY" Reinforced Plastic is an entirely new type high strength, light weight structural material with thousands of non-woven fine glass filaments uniformly aligned under even tension. 3M's background in adhesives has been used to achieve a lasting bond between the specially formulated thermosetting epoxy resin and the glass filaments.

3M research offers other resin systems for specific uses.

The terms "Scotch" and "Scotchply" and the plaid design are registered trademarks for the pressure-sensitive adhesive tapes and reinforced plastic made in U.S.A. by Minnesota Mining and Mfg. Co., St. Paul 6, Minn.—also makers of "SCOTCHLITE" Reflective Sheeting, "Thermofax" Copying Products, "3M" Abrasives, "3M" Adhesives, and many other products.



UNRETOUCHED PHOTO shows results of test at Carrier Corp. Top: Unidirectional "SCOTCHPLY" Reinforced Plastic spring with isotropic faces was without damage after three weeks of running at double normal load. Bottom: Unidirectional polyester spring broke down after 15 hours.

For complete information on the Carrier "Natural-Frequency" Conveyors, write Carrier Conveyor Corporation, Louisville 2, Kentucky.

For complete information on "SCOTCHPLY" Reinforced Plastic, write 3M Company, Dept. PA-57, St. Paul 6, Minnesota.

When inquiring check 3620 opposite last page

Aids in selection of plastic pipe for potable water supplies

A study, that is the result of four years of research by the National Sanitation Foundation conducted under a grant from the Society of the Plastics Industry, Inc., provides useful guide in selection of plastic pipe best suited for potable water supplies and other applications. Types of plastic pipe tested included polyethylene, polyvinyl chloride, rubber modified polystyrene, and cellulose acetate butyrate. Among test procedures used were extraction, weathering, exposure to soil, exposure to water and air, odor, effects of chlorine residual, and disinfection of plastic pipe systems.

To obtain "A Study of Plastic Pipe for Potable Water Supplies" remit \$1.00 direct to The Society of the Plastics Industry, Inc., Dept. CP, 250 Park Ave., New York 17, N.Y. When inquiring specify 3621 on the convenient Reader Service slip which is located opposite last page.

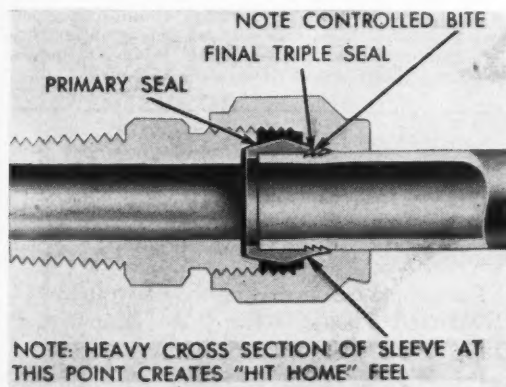
Efficient flareless tube fitting makes foolproof joint . . .

formation of butt-joint makes it unnecessary to spring tube during assembly

Uses: Fittings are designed for use in various pneumatic and hydraulic circuits.

Features: Formation of butt-joint eliminates need to spring tube when making assembly. Fitting is designed to avoid any need for flaring or threading to disassemble and inspect. It can be disconnected and reconnected often and still maintain positive seal.

Description: Available in steel or stainless steel, fitting consists of body, nut, and alloy-steel sleeve. Fitting remains pressure-tight beyond burst strength of tube itself, and conforms to JIC Hydraulic Standards and ASME Code for Pressures Piping.

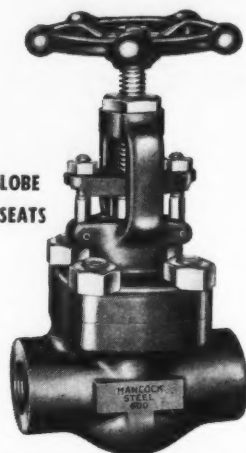


Fitting is designed for wide range of pneumatic and hydraulic pressure conditions

NEW 600# STEEL

NEW

TYPE 5500 — 600# GLOBE
INTEGRAL HARD-FACED SEATS
"500 Brinell"
Stainless Steel Discs.



Especially suitable for high pressure steam and temperature services in power plants. Sizes: 1/4" thru 2". **Standard Materials:** Forged carbon steel A.S.T.M. A-105 Gr. II. **Alternate Body and Bonnet Materials:** 1 1/4% Chrome, 1/2% Moly Steel, A.S.T.M. A-182 Gr. F-11. **Connections:** Screwed and Socket Weld Ends. For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F.

NEW

TYPE 5520 — 600# GLOBE
TYPE 5530 — 600# ANGLE
RENEWABLE "300 BRINELL"
STAINLESS STEEL SEATS
"500 Brinell" Stainless
Steel Plug Discs.



Ideal for processing plants and general industrial service. Sizes: 1/4" thru 2". **Standard Materials:** Forged carbon steel A.S.T.M. A-105 Gr. II. **Alternate Trims:** 18-8 Type 316 Stainless Steel; Monel. **Alternate Body and Bonnet Materials:** 5% Chrome, 1/2% Moly Steel, A.S.T.M. A-182 Gr. F-5; 18-8 Type 304 Stainless Steel A.S.T.M. A-182 Gr. F-304. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

These 600# bolted bonnet forged steel valves really make sense to every man who knows the economy of quality valves. Designed into them are plus values that substantially reduce profit-draining production shut-downs, maintenance problems and inventory costs. Built as companions to the widely-used Type 950 Hancock 800# Steel Gate Valves, they offer: **Thick, Rigid Body and Bonnet Flanges** that can withstand more than ten times the rated pressure of the valve. The flanges butt — no bending, no distortion.

Re-usable Flexitallic Bonnet Gasket, in combination with the rigid body and bonnet flanges, prevents bonnet joint leakage. The gasket is a spiral-wound ribbon of stainless steel with asbestos filler and spring-like com-

pressibility. It rests in a groove in the body flange — cannot blow out even if pressures exceed ten times the rating of the valve. *Hancock 600# Steel Valves are the first globe valves to use this important feature.*

Maximum Use of Stainless Steel. Even the stem, swing bolts, nuts, thread bushings and packing gland followers are stainless steel — your assurance of quality that saves throughout the long life of these valves.

The 5500 Line of Hancock 600# Steel Valves is available in Globe, Angle, "Flocontrol," Lift Check and Hi-Pressure Drop designs. Whatever your needs, you can buy these valves with complete confidence in their functional perfection. Like all other Hancock Valves, they are precision engineered and carefully manu-



HANCOCK VALVES



H1-57

PHONE YOUR INDUSTRIAL SUPPLY DISTRIBUTOR. His broad knowledge and experience can be of real value to you. Let him help you select the right Hancock Bronze and Steel Valves for all your service requirements.

HANCOCK VALVES

NEW

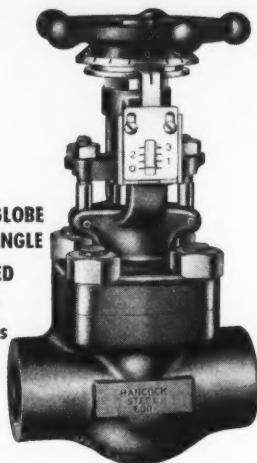
"FLOCONTROL"

TYPE 5525 — 600# GLOBE

TYPE 5535 — 600# ANGLE

RENEWABLE HARD-FACED
STAINLESS STEEL SEATS

"500 Brinell" Stainless
Steel V-Port Discs.



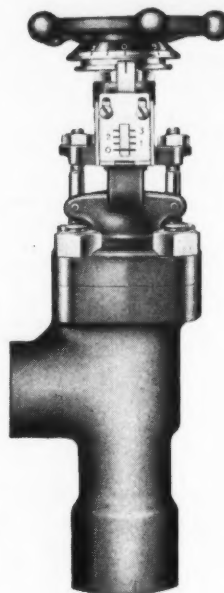
For general industrial service. Variable orifice, shut-off and index combined in a single valve. Any desired setting can be instantly duplicated. **Sizes:** 1/4" thru 2". **Standard Materials:** Forged carbon steel. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

NEW

HI-PRESSURE DROP

TYPE 5505 — 600# ANGLE
INTEGRAL HARD-FACED SEATS
Stainless Steel Tube.

An orifice type valve, with shut-off and index in a single unit that permits the use of a smaller valve with a large capacity. Designed to withstand the terrific wrecking power of continuous blow-down. Also for use on feed-water, by-pass relief, in turbine washing processes, and where erosion is extremely severe. **Size:** 1". **Standard Materials:** Forged carbon steel. **Connections:** Screwed and Socket Weld Ends. For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. A.S.M.E. maximum boiler pressure 970 psi.

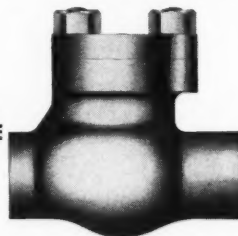


NEW

LIFT CHECK VALVE
TYPE 5540 — 600# GLOBE

RENEWABLE HARD-FACED
STAINLESS STEEL SEATS

"500 Brinell" Stainless
Steel Piston Discs.



For general industrial service. **Sizes:** 1/4" thru 2". **Standard Materials:** Forged carbon steel. **Cap:** Bolted. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

factured. You can be sure of long resistance to wire drawing, galling, steam cutting, erosion and corrosion — for leakproof tightness month after month. They surpass the toughest service demands of process and power piping systems in the most modern refineries, petrochemical, power and industrial plants. A high degree of standardization in all sizes simplifies both maintenance and inventory needs.

Let the durability, performance and economy of Hancock 600# Steel Valves save money for you. Whether you are adding facilities, building a new plant or setting up a revalving program, get all the reasons why these tough valves serve better and longer. Complete information is yours on request.

When Hancocks go in, valve costs go down

A PRODUCT OF **MANNING, MAXWELL & MOORE, INC.**

WATERTOWN 72, MASSACHUSETTS

MAKERS OF 'ASHCROFT' GAUGES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Okla. AIRCRAFT CONTROL PRODUCTS, Danbury, Conn. and Inglewood, California. "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUGGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Michigan.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

When inquiring check 3622 opposite last page

Shoulder on sleeve prevents incorrect assembly. Three serrated edges on sleeve bite radially into tube surface to a controlled depth, making triple seal. Sleeve will not move longitudinally in assembly, scrape or shave tubing, and there is no torquing of tube when making joint.

Fitting is available in sizes for 1/8 to 1 1/2" OD tube. Each size can be furnished with long Dryseal Pipe Threads, or with straight threads with O-ring seal. Fitting may be used with steel, stainless steel, copper, aluminum, and Monel tubing.

(Hi-Seal flareless tube fitting is product of Imperial Brass Manufacturing Co., Dept. CP, 1200 W. Harrison St., Chicago 7, Ill. . . . or for more information check 3623 on form opposite last page.)

Here's the economics of design for asbestos insulation

Not only are technical, manufacturing, and installation data included on this long-fiber asbestos pipe insulation, but about half of book's 40 pages are devoted to the economics of specifying thickness of insulation. Pipe temperatures from 200 to 1200°F, and insulation thicknesses from 1 to 5 inches are covered.

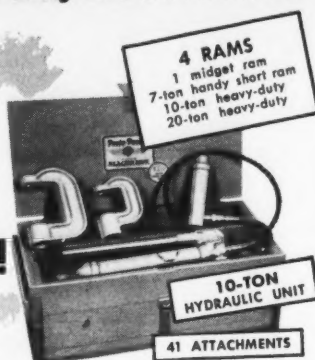
"Unibestos Insulation" is issued by Union Asbestos & Rubber Co., Dept. CP, 1111 W. Perry St., Bloomington, Ill. When inquiring check 3624 on form opposite last page.



"Looks like they just handed us another sweet new project!"

Master heavy-duty assortment of

hydraulic tools for maintenance!



4 RAMS
1 midgel ram
7-ton handy short ram
10-ton heavy-duty
20-ton heavy-duty

10-TON
HYDRAULIC UNIT

41 ATTACHMENTS

Press bearings, pull gears, spread die-sets, lift machines, clamp materials

Let hydraulic power do the work when and where you need it! Portable, easy-to-use Porto-Power works faster, safer, easier. Master maintenance kit contains essential rams, pump and 41 job-designed attachments. Call your industrial supply house for complete details.

FREE Blackhawk Catalog H-201 shows new ways to cut maintenance costs! Write Dept. P-6857.



BLACKHAWK

BLACKHAWK MFG. CO., MILWAUKEE 46, WISCONSIN

When inquiring check 3625 opposite last page

FOR MAXIMUM SAFETY

all over your plant use Safety GRIP-STRUT



Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.



Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer — warm in winter

Big Economy Features

- ★ For balconies — no extra light needed below — no extra heat.
- ★ No extra supports necessary — channels are integral part of the material
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost



Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."



GRIP-STRUT division

THE GLOBE COMPANY • Manufacturers since 1914
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

When inquiring check 3627 opposite last page

engineering and maintenance



Underground outdoor tank farm at Parke, Davis & Co. Bulk solvent storage and transfer system reduce raw material cost. Arrow at right indicates double row of turbine pumps

By pumping variety of solvents from outdoor storage to reaction vessels as required, Parke, Davis can buy in quantity so that . . .

THEODORE W. WETT, Assistant Editor
With D. J. VINK, Superintendent
Parke, Davis & Co., Holland, Michigan

At Parke, Davis an estimated saving of approximately \$140,000 a year has been realized by installation of a bulk handling system for solvents. Plant uses about 800,000 gal of solvents a year, and bulk system results in a saving of about 26% in purchase price. In addition there are reduced material handling costs, saving in valuable indoor floor space, and reduced storage hazards for flammable items.

Tank cars or trucks deliver solvents (including benzol, xylene, acetic anhydride, aqueous ammonia, isopropyl alcohol, methyl alcohol, acetone, isopropyl ether, methylal, and ethyl acetate) to 15 horizontal cylindrical tanks, varying in capacity from 2000 to 15,000 gal. Tanks are located outside the plant and are mounded over with sand and crushed rock.

Fifteen turbine pumps, one mounted atop each buried tank, pump solvents through transfer pipelines at a rate of 40 gpm to respective reaction ves-

STEELCOTE CORROSION NEWS

1957

REPORTING THE LATEST DEVELOPMENTS IN CORROSION CONTROL

1957

STEELCOTE EPOXY RESEARCH HAS PRODUCED MANY NEW PRODUCTS

In addition to EPO-LUX 100 and ZINC RICH ZINC DUST PRIMER, Steelcote research has produced epoxy products that set new standards of performance in the fields of floor repair and resurfacing, tank linings, boat bottom construction and repairs of cracks in metal. In addition, Steelcote manufactures a 15-minute dry floor enamel, DAMP-TEX wet surface enamel, HALTS-RUST for rusted metal and more than 100 other products.

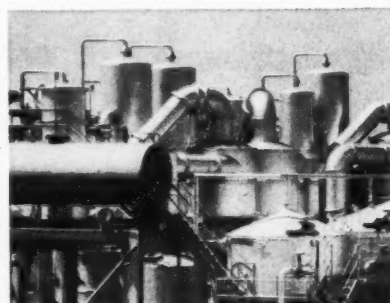
INVITATION TO CORROSION ENGINEERS

For information on any Steelcote product or for engineering service, write Dept. 8, Steelcote Mfg. Co., 3418 Gratiot St., St. Louis 3, Mo., U.S.A. In Canada: Steelcote Mfg. Co., Ltd., Rodney, Ontario. Jobbers in principal cities.

Steelcote Epo-Lux Zinc Rich Zinc Dust Primer Licks Industry's Tough Corrosion Problems

Adhesion and Flexibility of Steelcote Epoxies Make Possible Cathodic Action of Galvanizing In On Site Application at About 1/3 the cost

Ninety per cent pure zinc metal coating, epoxy impregnated for adhesion and flexibility, makes possible overcoats of EPO-LUX which protect against acids, alkalis, salts and solvents. This combination gives the longest-lasting, most effective corrosion control of any cold applied on site coating. We invite you to undertake an immediate test application.



When inquiring check 3626 opposite last page



Each turbine pump delivers 40 gpm of desired solvent to reaction vessels 250 to 600 ft away



bulk solvent storage saves \$140,000 a year

sels. Lines vary from 250 to 600 ft in length. Technicians operate pumps from inside plant. Totalizing meters permit delivery of exact amounts. Since pump impellers are submerged in the liquids, they have no suction lift, will not vapor lock.

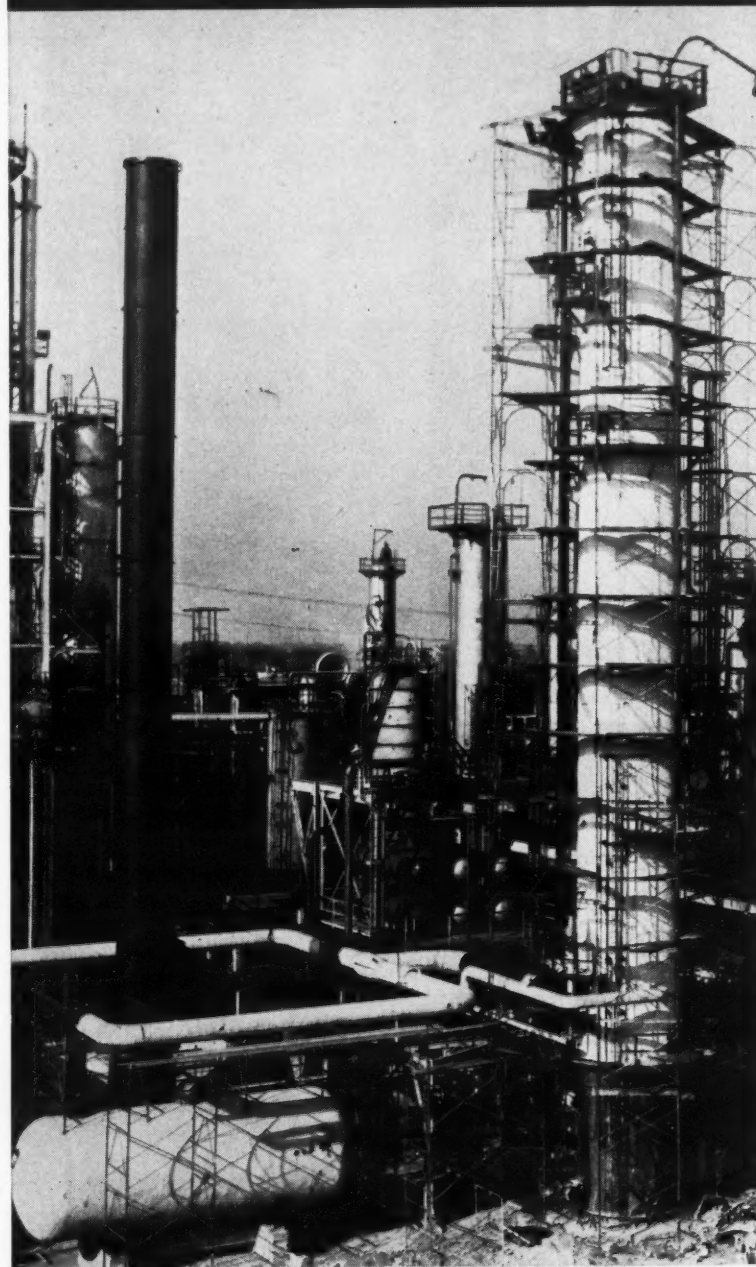
(Turbine pumps were supplied by Deming Pump Co., Dept. CP, Salem, Ohio . . . or for more information check 3628 on form opposite last page.)

Explains operating principle of flexible coupling

Torsionally-flexible power shaft couplings are described in 24-page catalog. Operating principle, which uses preloaded rubber biscuits as flexible medium, is explained and illustrated. Dimensions and specifications are given on standard, double, and radial-type couplings. Torsional deflection charts, with illustrated examples, tell how to select proper size coupling for given systems.

Cat C 41-56 is issued by Morse Chain Co., Dept. CP, South Aurora St., Ithaca, N.Y. When inquiring specify 3629 on the convenient Reader Service slip located opposite last page.

On Country's First REXFORMER® at AURORA REFINERY . . .



BALDWIN-HILL COMPANY

Complete Line of Industrial Insulations



405 Breunig Avenue Trenton 2, N. J.
Huntington, Ind. Kalamazoo, Mich. Temple, Texas

time saved by
quick setting of

BALDWIN-HILL SUPER POWERHOUSE Insulating-Finishing CEMENT

B-H SUPER POWERHOUSE CEMENT, combining insulation value with a glazed white finish, was selected instead of a straight insulating cement because of its quick setting ability and good water resistance prior to weather coating. Rain, sleet or snow does not adversely affect the cement after setting. Its application speeds work — allows other operations to proceed with little delay.

SUPER POWERHOUSE CEMENT is a dry, fibrous material having a spun mineral wool base and a fast, hydraulic setting binder. It remains workable for two hours and then takes a hydraulic set in four to five hours.

SUPER POWERHOUSE was applied directly to the rib lath on the B-H spun mineral wool BLANKETS.

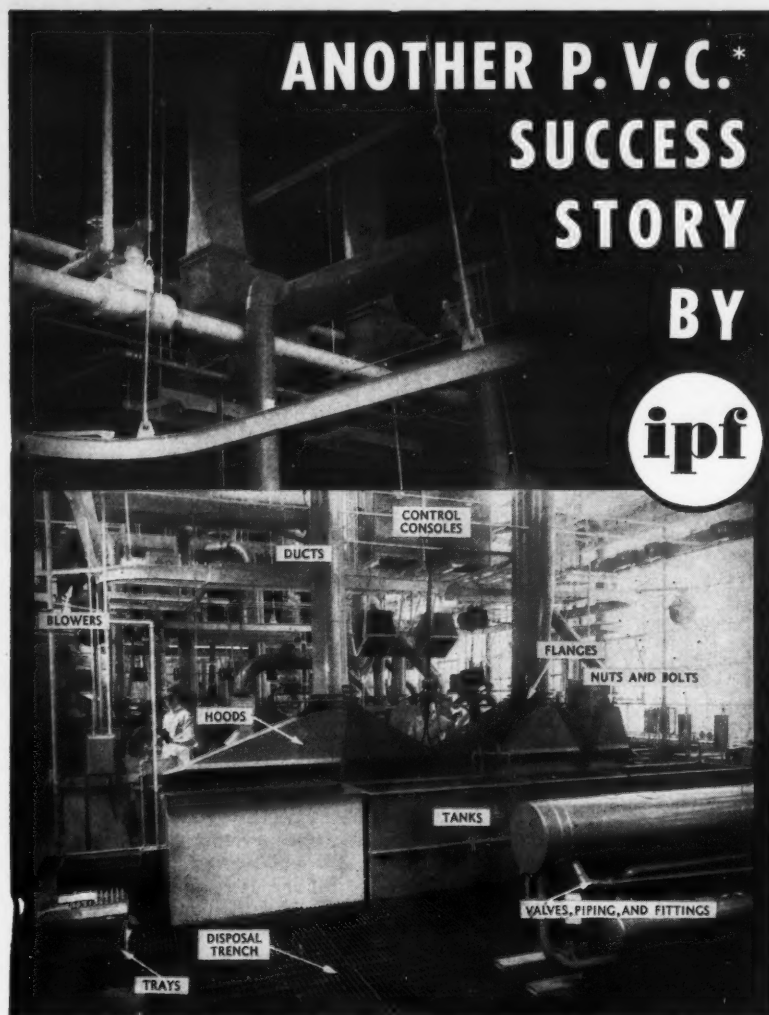
See our catalog in
Sweet's Plant Engi-
neering File.



For more information,
staple the keyed cor-
ner of this ad to your
letterhead and mail.

J-33

When inquiring check 3630 opposite last page



Scintilla Division of Bendix Aviation Reports Maintenance-Free P.V.C. Service

**Rigid Polyvinyl Chloride (P.V.C.) Fabrication by Industrial Plastic Fabricators — the new material of construction — is being used for 90% of the equipment at Scintilla Division's new Plating Rooms.*

These facilities, generally recognized as the most modern in the country, have used IPF Products without a single replacement.

Complete information on P.V.C., "the new material of construction" available upon request.

Plating tanks...stands...exhaust systems...baskets and trays...and drainage troughs were a frequent source of interrupted production when corroded metal equipment needed replacement. Even costly rubber lining of the metal to protect against the acids and corroding fumes did not solve the problem. But — since Scintilla Division's conversion to P.V.C. — no replacements, no slowdowns, no lost time.

IPF blowers, hoods, tanks, ducts, piping systems, valves, nuts, and bolts, and machine parts can also solve your corrosion problems. P.V.C. is a lightweight, smooth surfaced, nonporous, plastic material. Its inherent anti-corrosive qualities insure long life — reduced maintenance costs..

MANUFACTURED BY

Industrial plastic fabricators, inc.

NORWOOD, MASS.

NORWOOD 7-3411

When inquiring check 3631 opposite last page

ENGINEERING & MAINTENANCE

Reprint of tech paper discusses alloys for main steam pipe

Reprint of technical paper covers high strength alloys for main steam piping. Three main aspects discussed in 28-page reprint are: problem of behavior and selection of main steam piping materials; historical and technical background of development of materials; and materials currently used in stations operating at 1200°F and 5600 psi.

Reprint "Metallurgical Considerations of Main Steam Piping for High Temperature, High Pressure Service" is available from Tempil Corp., Dept. CP, 132 W. 22nd St., New York 11, N.Y. Specify 3632 opposite last page.

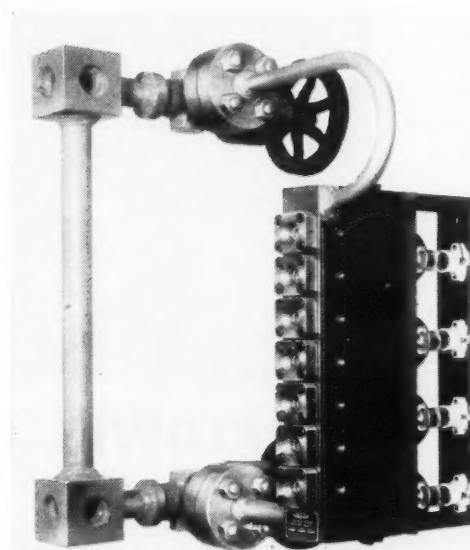
Gage provides two-color readings, and reduces maintenance time on boilers...

individual cover-glasses permit quick, easy servicing without removing gage from boiler

Uses: Unit is designed for high pressure boilers, up to 3300 psi.

Features: Gage provides two-color readings. Individual cover-glass assemblies permit quick, easy servicing without removing gage from boiler.

Description: Water shows green and steam shows red in port-type openings. "Floating assembly" port-covers have spring cones that apply safe, predetermined load on glass ports. Socket-head capscrews replace conventional bolting. Simple,



Water gage for high-pressure boilers features bright, "stop" and "go" colors



TEMPERATURE MEASUREMENTS

with

the improved

PYRO OPTICAL PYROMETER

Always gives quick, sure, accurate temperatures. Self-contained and direct-reading. Stock ranges 1400°F to 7200°F.

Send for FREE catalog No. 85.

and

PYRO SURFACE PYROMETER

Light, portable, quick-acting PYRO Surface Pyrometer shows precise temperatures on easy-to-read 4 3/4" dial. Ruggedly built, with five standard temperature ranges.



Send for FREE catalog No. 168.

**PYROMETER INSTRUMENT
CO., INC.**
BERGENFIELD 11, NEW JERSEY

When inquiring check 3633
opposite last page

CHEMICAL PROCESSING

compact design permits installation of unit in small space. Mirror arrangements transmit lighted view of gage face to convenient eye-level on operating floor. Gages are available for pressures from 900 to 3300 psi, and for visibility ranges from 13 to 21".

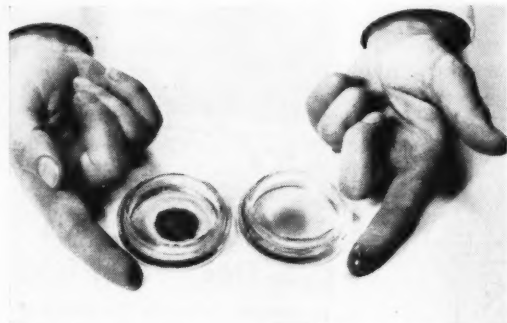
(Color-port water gage is product of Yarnall-Waring Co., Dept. CP, Mermaid Lane, Philadelphia 18, Pa. . . or for more information check 3634 on form opposite last page.)

**Oil carbon deposits vanish
when special lubricant
is used . . .**

resists oxidation, sludging, and breakdown

Uses: Developed as lubricant for air compressors, electric motors, and other machines operating at high temperatures.

Features: Field tests show lubricant resists oxidation, sludging, and breakdown in air compressors and other machinery operating at high temperatures in hot, cold, wet, or chemically-con-



After being baked in oven for 72 hrs at 300°F, conventional oil (left) evaporated and carbonized while low carbon oil (right) remained liquid and clear

taminated atmosphere. Test results show 500% longer usability, 66% savings in maintenance costs, 60% savings in oil consumption, and substantial power savings.

Description: Physical properties of Keystone 49 Light lubricant are:

Flash point	425°F
Fire point	495°F
Viscosity index	96 sec
Pour point	minus 5°F
Carbon residue (Conradson)	0.33%
Corrosion ASTM	Negative
SAE No.	30

(Keystone 49 Light is product of Keystone Lubricating Co., Dept. CP, 3100 N. 21st St., Philadelphia, Pa. . . or for more information check 3635 on form opposite last page.)



"Problem weld between dissimilar alloys ... Inco-Rod "A" takes it in stride!"

says Rolock's Chief Engineer

Rolock Inc., Fairfield, Conn., builds equipment for high-temperature service. To them, difficult welds between dissimilar alloys are an everyday affair.

The welder above, for example, is completing fabrication of a furnace retort. The flange is steel. The corrugated section at right is Inconel* nickel-chromium alloy . . . to withstand temperatures up to 2050° F.

Trouble at the joint? None at all, now that Rolock is using Inco-Rod "A"* electrode!

"With previous electrodes," writes George Wardwell, Chief Engineer at Rolock, "considerable reworking was needed to eliminate cracks and fissures in problem welds like this one. Now, with Inco-Rod "A" electrode, our welders work with assurance that the finished weld will be sound in every respect."

Get sound joints when you weld dissimilar alloys. With Inco-Rod "A" electrode, you get strong, ductile welds . . . corrosion-resisting . . . of X-ray quality.

And versatile Inco-Rod "A" electrode produces these quality welds in *many* alloy combinations: among ferritic and austenitic stainless steels . . . low alloy and mild steels . . . high-nickel, and other alloys.

What's more, Inco-Rod "A" . . . the electrode with the green flux coating . . . is easy to use. Operates in all positions. Gives spray-type arc and easy slag removal. And manufacturers, who have found that they needed to pre-heat to prevent hot cracking or fissuring in the weld metal when using other electrodes, find that with Inco-Rod "A" electrode they can produce strong, ductile welds *without pre-heat*.

Call on Inco whenever you're faced with a 'problem' weld between dissimilar alloys. If the problem's *now*, write our welding specialists today!

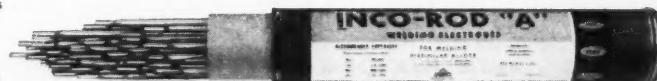
*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

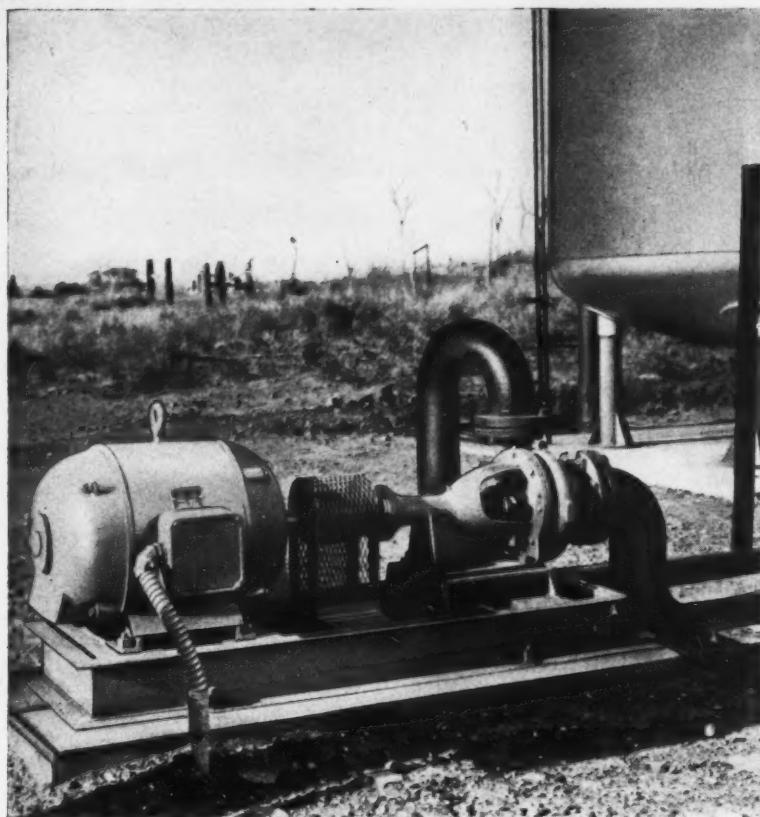
INCO-ROD "A" electrode is supplied in 14-inch lengths in four diameters, 3/32-, 1/8-, 5/32-, and 3/16-inch (the 3/32-inch is center grip) . . . packed in 5-lb. asphalt-lined containers.



Welding Products • electrodes, wires, fluxes



When inquiring check 3636 opposite last page



A Centrifugal Pump Salt Water Can't Damage!

Ampco Pumps are ideal for salt-water disposal and flooding operations:

- Transfer service
- Pumping over aerators
- Pumping through filters
- Back-flushing filters
- Delivery of treated water

It's an AMPCO... made from aluminum bronze that contains no zinc.

Ampco Pumps resist corrosion, erosion, abrasion, cavitation-pitting, and dezincification. They are made from Ampco alloys engineered specifically to resist salt water corrosion.

Durability isn't the only advantage of Ampco Pumps. They have high efficiency... up to 85%. You pay considerably less for power.

Ampco Pumps are available in more than 100 different combinations, with speeds from 1750 to 3500 rpm; capacities to 600 gpm; heads to 300 feet.

Contact us in Milwaukee for the name of your nearest AMPCO PUMP DISTRIBUTOR.



AMPCO METAL, INC.
Dept. CP-5, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.
THE METAL WITHOUT AN EQUAL
P-23

When inquiring check 3637 opposite last page

ENGINEERING & MAINTENANCE

Manual details information on aluminum insulation

Illustrated 40-page manual gives detailed information on aluminum insulation jacketing for tanks, vessels, and piping systems of chemical and other process industries. Basic engineering data are presented to help in evaluating essential design information.

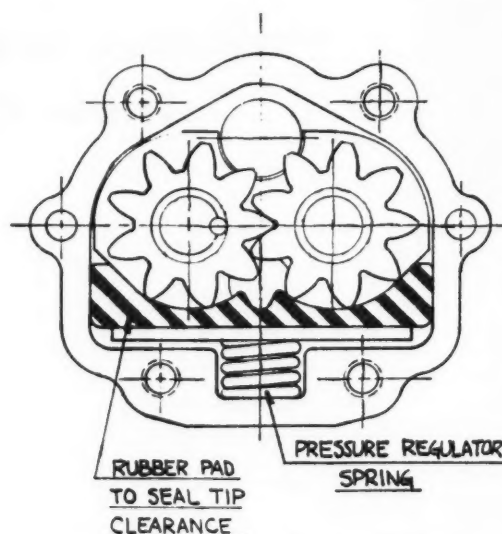
"Kaiser Aluminum Insulation Jacketing Materials and Methods" is issued by Kaiser Aluminum & Chemical Corp., Dept. CP, Kaiser Bldg., 1924 Broadway, Oakland 12, Calif. When inquiring specify 3638 on form opposite last page.

Flow through pump goes up as temperature rises...

unlike conventional pumps where rate tends to drop off

Uses: Pump can be adapted for fuel injection systems and various types of manufacturing equipment.

Features: Unlike conventional pumps which tend to reduce flow as temperature rises, output



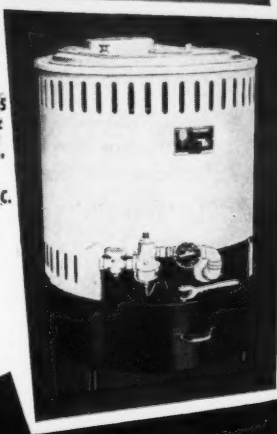
Pump features simple design that lends itself to low cost manufacturing techniques

of pump is maintained at a slightly higher level as temperature rises. Pump can be used for pressure applications up to 200 psi.

Description: Basic version of pump has two conventional gears mounted on shafts in simple housing which can be designed to suit specific application. Mating gears can be mass produced without penalty of close tolerances or fine tooth finish. Housing cavity can be used practically as



Model 5-25
Automatic
Gas Fired
"INCINOR"
Mfd. by
BOWSER, INC.
Finished
in white
SICON



The sparkling white finish of this home incinerator stands flash temperatures of as high as 550°F.!

It's **Sicon** Silicone Coating

SICON withstands the shock of high heat combustibles without peeling or blistering. Retains luster and beauty over long periods of time. Now used on all INCINOR models. SICON, the original silicone finish, has proved best for a long list of other nationally known products.

WRITE
Dept. E-3



When inquiring check 3639
opposite last page

CHEMICAL PROCESSING

PS*



*POWERS SERVICE

Yes, P.S. stands for Powers' Service — mighty important when you need temperature control systems for process or plant hot water or steam lines. It means that you get more than just a product; you get a complete service that includes application engineering counsel, prompt delivery from local stock, installation engineering, and service instructions for your plant personnel. All this is readily available through more than 60 factory branch offices in the United States and Canada.

Powers' service allows complete freedom of temperature control planning and installation, too, for Powers Controls are available on an installed basis or as equipment only. Call your local Powers branch today for the full story, or write to:

THE POWERS REGULATOR COMPANY
Skokie 16, Illinois Dept. 557

POWERS

PROCESS CONTROL

When inquiring check 3640
opposite last page

MAY 1957

ENGINEERING & MAINTENANCE

die-cast, without machining or profiling around the periphery. Molded synthetic rubber element (see drawing) conforms with zero clearance to gear teeth along pressure outlet side of pump.

To provide for safety of operation, calibrated spring is provided (see drawing) to control action of tip clearance pad. Molded synthetic rubber diaphragm is installed under gears. Its use permits reasonable degree of backlash in mounting of gears within the housing. Tests on pump with 1.5" dia gears produced following results: With fluid (SAE 20 oil) held at 180°F, pump delivered flow of 12 gpm at 60 psi with pump speed of 2200 rpm. When temperature level was raised to 250°F, flow increased about 0.3 gpm under same operating conditions.

(Gear pump is manufactured by New Products Corp., Dept. CP, 3636 Oakton St., Skokie, Ill. . . . or for more information check 3641 on form opposite last page.)

Presents technical information on castable refractories

Characteristics and technical information on insulating and heavy-duty castable refractories are presented in four-page bulletin. Linear shrinkage, modulus of rupture, and thermal conductivity charts for both types of refractories are included.

Bul 1992 is issued by Norton Co., Dept. CP, Worcester 6, Mass. When inquiring specify 3642 on form opposite last page.



"Just think . . . I complained about having
to do the dishes last night!"

Cartoonist W. R. Kuhn, Jr., works for the Avon Refinery of Tidewater Oil Co., Associated, Calif.



This Ampco Pipe has a
3/4" wall, to handle
sulphuric acid sludge
in oil-company operation.

Sulphuric Acid Sludge No Problem

for major oil company,* in 1000-lb. transfer service

Its Ampco Pipe and Fittings resist corrosion

Many other companies avoid corrosion shut-downs this same way.

Ampco Pipe is made from an exclusive aluminum-bronze alloy that . . .

- (a) Resists many acids and caustics.
- (b) Withstands the action of abrasive solids in suspension—resists cavitation-pitting.
- (c) Has a Brinell hardness of 150 and tensiles up to 70,000 psi.
- (d) Stands up under wrenches and hammers, without thread distortion and subsequent leakage.
- (e) Has high velocity tolerance—flow rates of 18-20 fps.

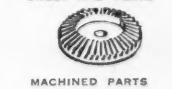
You can get Ampco Pipe in all standard sizes, many from stock. Fittings are available to 3000 psi; flanges, to 5000 psi.

Write us concerning your problem.

AMPCO METAL, INC.

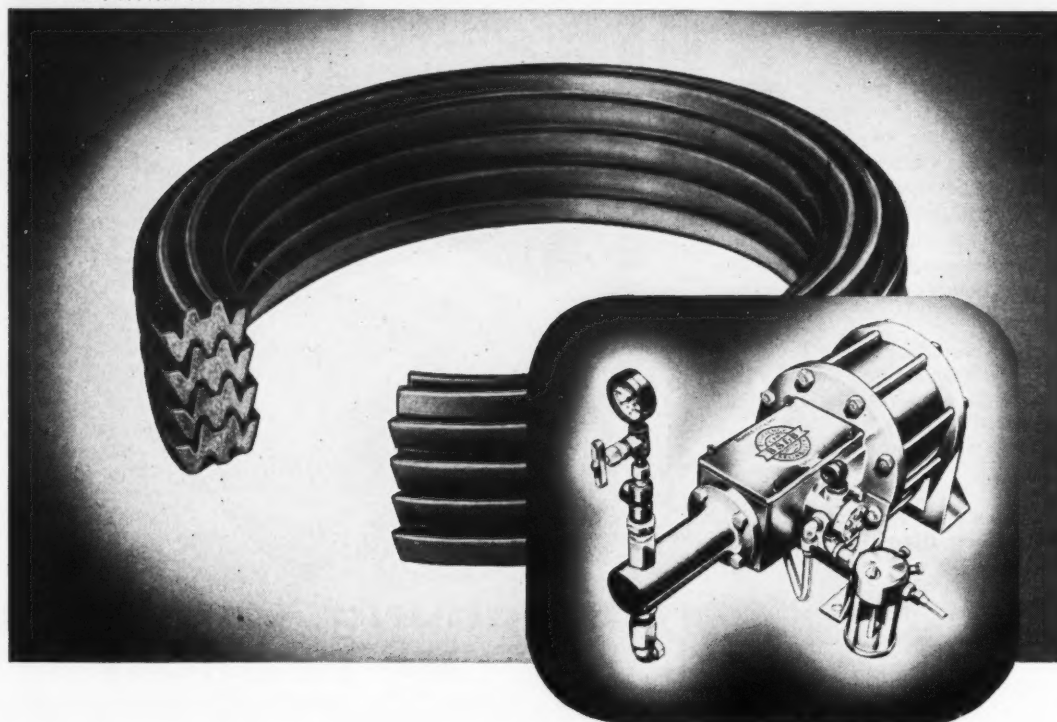
Dept. CP-5, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.

THE METAL WITHOUT AN EQUAL



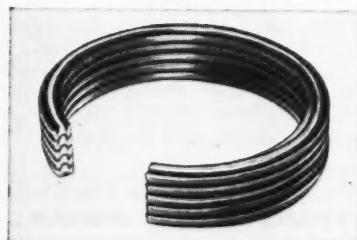
When inquiring check 3643 opposite last page

J-M Uneepac® does it again!



"Very satisfactory sealing service
against wide variety of fluids
and pressures up to 5,500 psi"

says Black, Sivalls and Bryson, Inc.
makers of BS&B Glycol Pump



Uneepac comes in two types. Shown here is design for flange widths up to 1/2" which is used in BS&B Glycol Pump. Large illustration above shows design for flange widths over 1/2".

Chalk up another success story for Uneepac—Johns-Manville's automatic ring packing. In the BS&B Glycol Pump, fluids handled include triethylene glycol, diethylene glycol, gasoline, and various types of oils, alcohols and petroleum treating chemicals. Working pressures range from 125 psi to 5,500 psi with average operating pressures at 3,000 psi. Yet despite these rugged service conditions, Uneepac has delivered—in Black, Sivalls and Bryson's own words—"very satisfactory service."

Many other packing users have acclaimed J-M Uneepac for its long, trouble-

free service. Each ring is a complete packing unit. Fewer rings are needed than ordinarily required and stuffing box size can be reduced to the minimum. Each ring centers itself automatically on the preceding ring to simplify installation. This exclusive design also permits fluid pressure to act upon each lip individually and protects lips from excessive gland pressure.

J-M Uneepac comes in a wide range of styles and sizes for many rod and plunger applications. For further information write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.



Johns-Manville PACKINGS, GASKETS and TEXTILES

When inquiring check 3644 opposite last page

ENGINEERING & MAINTENANCE

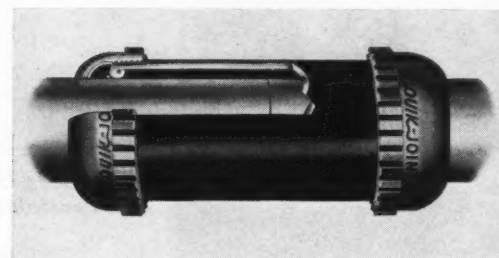
**Thread cutting eliminated,
labor costs reduced 50%
with pipe coupling . . .**

may be quickly and easily installed on pipes
with up to 6° misalignment

Uses: Device for coupling pipes.

Features: Thread-cutting is eliminated, and coupling reduces labor costs as much as 50% over that required for conventional unions.

Description: All-steel pipe coupling is slipped over unthreaded pipe ends and tightened with conventional pipe wrench. Close-tolerance pipe measurement is unnecessary, and coupling may be installed on pipes with up to 6° misalignment.



Coupling is slipped over unthreaded pipe ends and tightened with conventional pipe wrench

Leaks may be easily repaired by cutting pipe at leak and installing coupling. Rubber-mounted fit-up absorbs vibration to prevent sound "telegraphing", and compensates for expansion and contraction which often break conventional threaded connections. Pressures up to 2000 psi can be withstood by coupling.

(Quik-joint coupling is product of Guardian Products Corp., Dept. CP, 1215 E. Second St., Michigan City, Ind. Check 3645 opp. last page.)

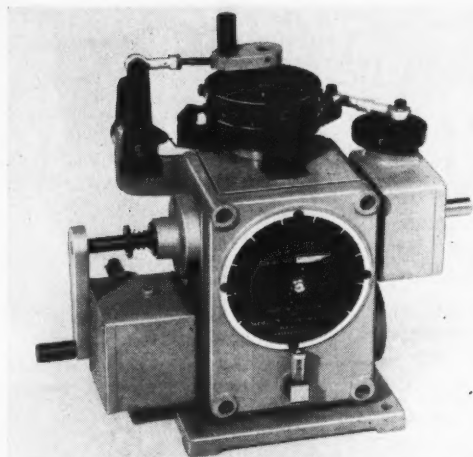
**Variable-speed transmission settings
adjustable while unit is operating . . .**

can be regulated manually or automatically
over complete range of 8:1

Uses: For applications requiring variable-speed operation.

Features: Settings can be adjusted manually or automatically over complete range of 8:1 while unit is operating. Transmission control is arranged by electrical, mechanical, hydraulic, or pneumatic means.

Description: Transmission components run in oil and are completely enclosed. Operational spur, bevel, or worm gear reductions are available and may be installed in any of four positions. Power is transmitted through multiple contact of driving



Only two socket wrenches are needed for dismantling and reassembly of variable-speed transmission

and driven discs which are free floating on splined shafts equipped with only moderate axial loading. Discs can be easily replaced for less than components in conventional types of transmissions.

(Variable-speed transmission is product of George E. Clentimack Co., Dept. CP, 229 West St., North Attleboro, Mass. Check 3646 opp. last page.)

**Protection and color-coding
for insulated pipe
in one coat . . .**

material is resistant to dilute acids and alkalis, solvents, water, and fire

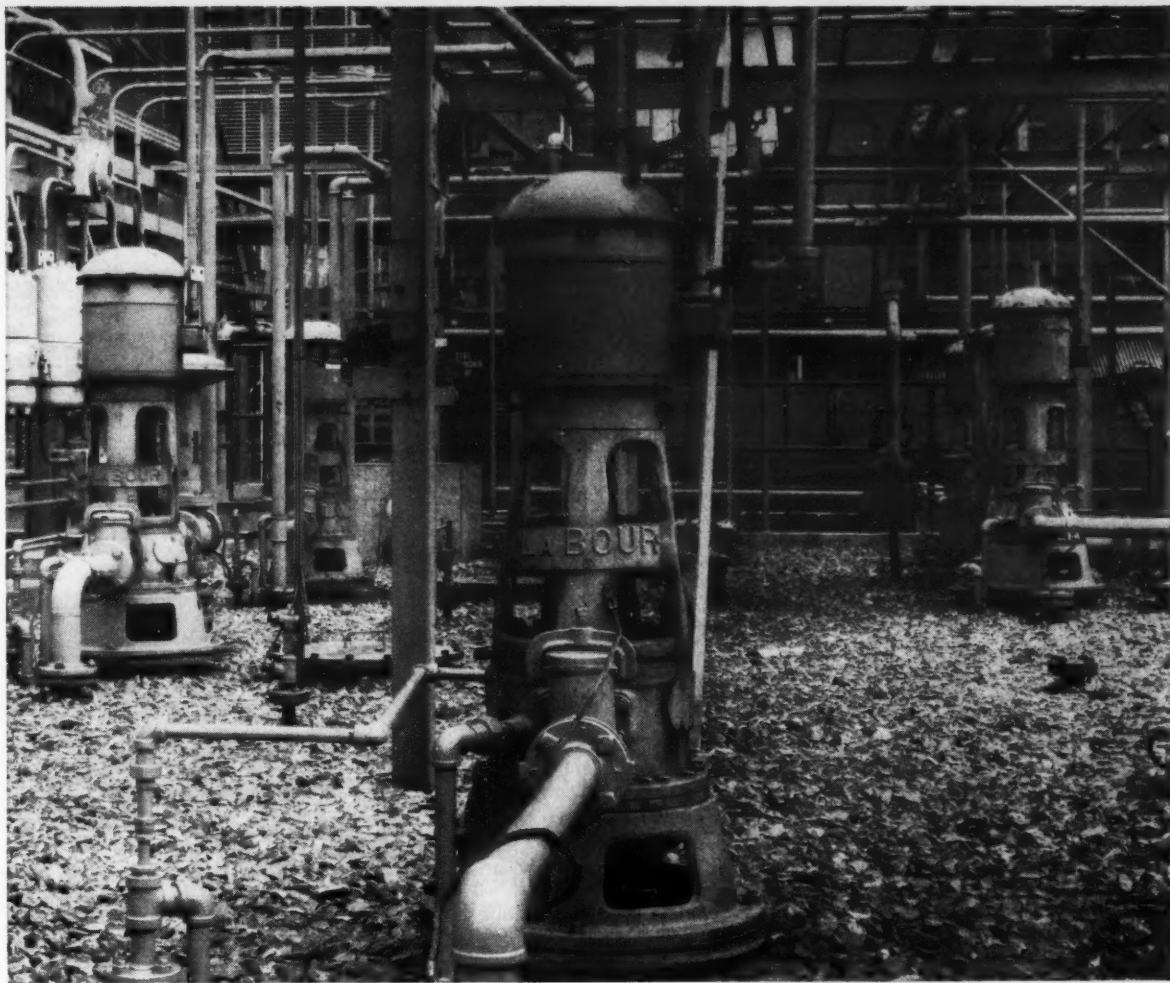
Uses: Provides protective coating for indoor and outdoor thermal insulation.

Features: Protection and color-coding for insulated pipe provided in one coat.

Description: Flexible, fire-retardant coating comes in nine standard colors selected to blend with industrial color schemes and for identification by color coding. Material is resistant to dilute acids and alkalis, solvents, and water. It can be used as an adhesive for cementing and sealing lightweight fabrics, such as 8 oz canvas muslin, foamglass, Styrofoam, fibrous glass, etc.

Viscosity	Brushing
Wet weight per gal, lb	11
Solids, per gal, lb	6.5
Drying time, hr	1 to 4
Temperature limit °F	-50 to 180
Thinner	Water
Application	Brush, spray or roller

(Lagtone protective coating is product of Benjamin Foster Co., Dept. CP, 4635-37 W. Girard Ave., Philadelphia 31, Pa. . . or for more information check 3647 on form opposite last page.)



Historically Significant

The LaBour pumps in this picture are relatively new, but they are nevertheless significant of important historical facts. The first LaBour pump was installed by Tennessee Eastman Company in this plant at Kingsport, Tenn. in 1931, and they have purchased a total of more than a hundred additional LaBours at intervals since then.

Most of the LaBour pumps being sold today go to customers like this one, who know from their own experience that LaBour means dependable service with minimum maintenance. And because

LaBour was the first commercial producer of a self-priming centrifugal pump, the experience records of many companies go back more than 30 years.

The pumps in the above picture are LaBour's latest packingless type, which of course were unknown in 1931. The consistent performance records of the earlier LaBours, however, warranted the choice of the new ones, just as this whole history warrants your investigation of LaBour pumps for your chemical-handling jobs.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.

When inquiring check 3648 opposite last page



News

Wherever
CORROSION
RESISTANCE
is a Factor...



HAVEG DUCT
solves
SO₂ fume
removal
problems

RESISTANCE TO ACID ATTACK MAKES THE DIFFERENCE AT ATLANTIC REFINING COMPANY ACID PLANT

Production of 150,000 lbs. of sulphuric acid daily posed a major corrosion problem for Atlantic Refining Company at its Philadelphia plant. Vapors boiled off from refinery sludges during recycling operations in the recovery plant contain SO₂ concentration as high as 65% ... at temperatures up to 250°F! After testing several materials for required properties, Haveg 41 was selected for installation of the fume duct and scrubbing system pictured above. The result? No evidence of corrosion—after more than two years of continuous operation!

Haveg Performance Proved by Experience

Three 18" ducts feeding into an 18" header carry the gas to a scrubber 36" in diameter and 29' in height, also constructed of Haveg 41. Since installation of the Haveg fume removal and scrubbing system

external corrosion of other equipment has been substantially reduced. Elsewhere at the plant Haveg pipe, processing vessels and duct installations have proved Haveg's exceptional resistance to corrosion, physical strength and thermal versatility for over 15 years of superior performance.

A Haveg Plastic for Every Service Requirement

No other material offers as wide a range of effective resistance to corrosive acids, hypochlorites, salts, alkalies, and solvents as the Haveg plastics. Custom design and field service assures you full advantage of Haveg's low net cost for every process installation. Let a qualified Haveg corrosion engineer help you determine the Haveg plastic and equipment design best suited for your needs... or write for Haveg Bulletins describing the complete line of corrosion resistant equipment.

H-701

HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY IN PIPING • PUMPS • PROCESS TANKS • FUME DUCTS • VALVES • HEAT EXCHANGERS

HAVEG INDUSTRIES, INC.

924 Greenbank Road, Wilmington 8, Delaware
Factory: Marshallton, Del. Phone WYman 8-2271

Atlanta, Cedar 7-3821 • Chicago (Wheaton), Wheaton 8-3225 • Cleveland, Washington 1-8700 • Detroit (Livonia), Kenwood 1-1785 • Houston (Bellaire), MOhawk 7-6519 • Los Angeles • New York (Westfield, N.J.), Westfield 2-7383 • Seattle, Main 9006 • Denver, Belmont 7-0433 • Canada: Montreal, Glenview 7791 • Toronto, Russell 1-5559 • Monterrey, Mexico

When inquiring check 3649 opposite last page

ENGINEERING & MAINTENANCE

**Field coil insulating system
can withstand vibration
and thermal shock...**

designed to protect electric motors and generators against chemical, atmospheric contaminants

Uses: System is suitable for applications requiring chemical resistance, oil and moisture-proofness, or sealing against atmospheric contaminants such as carbon black, dust, and dirt.

Features: Withstands destructive forces of vibration and thermal shock, and requires little or no maintenance.

Description: Primary insulation in "integrated" field coil construction is glass with fibers tailored and oriented for maximum strength. Solventless



Pressure molded glassy finish effectively seals out contaminants

types of inorganic, heat-stable resins augment glass fibers. These resins bond so well with coil conductors and pole surfaces that structure is fused together into one integral part. Available for synchronous and DC motors subject to severe duty cycling in Class A and B temperature classifications, construction results in dimensional stability, durability, toughness, and resiliency.

(Field coil insulating system is product of Allis-Chalmers Mfg. Co., Dept. CP, 1151 S. 70th St., Milwaukee, Wis. . . . or for more information check 3650 on form which is located opposite last page.)

Points out features of pump for use up to 60,000 psi

Design features of chemical proportioning pump having capacities up to 31.21 gph, at pressures up to 60,000 psi, are pointed out in eight-page bulletin. Large, cross-sectional drawing shows component parts. Selection charts for adjustable and fixed stroke pumps are included.

Bul 4065 is issued by American Instrument Co., Inc., Dept. CP, 8030 Georgia Ave., Silver Spring, Md. When inquiring specify 3651 on form which is located opposite last page.

SWING YOUR PRODUCTS INTO LINE



Style 20

OPW
SWING JOINTS
SWING EASY!
FLOW EASY!



Style 60

Style 30

Style 40

Style 50

BRONZE • STEEL • ALUMINUM • MONEL

FULL UNRESTRICTED FLOW • EFFORTLESS MOVEMENT • GREATER LOAD CARRYING CAPACITY • "O" RING SEALED CONTAMINATION FREE OPERATION • PERFECT ALIGNMENT

The wide range of sizes and styles of OPW BALL BEARING SWING JOINTS offers many and varied applications for safely handling liquids of diversified viscosity at required temperatures and working pressures.

Free Catalog F-8 provides engineering data, sizes, styles and recommendations.

JORDAN CORPORATION
Division of OPW Corporation



6013 Wiebe Road
Cincinnati 13, Ohio
ELmhurst 1-1352

When inquiring check 3652
opposite last page

CHEMICAL PROCESSING

Another way **CHEMICAL PROCESSING** is different

How "editorial landscaping" benefits YOU

Here's what CP's Art Editor said two years ago . . .

Over the editor's shoulder



Editorial landscaping

This spring I had the opportunity of seeing beautiful Bellingrath Gardens near Mobile, Alabama. One thing that impressed me about these sixty acres that bloom the year 'round is the organized planning in presenting the colorful plant life to the tourist. In every direction I was greeted with a combination of precise order and graceful line.

It struck me that we are striving for something comparable in our "landscaping" of the editorial pages of **CHEMICAL PROCESSING**. Objective of our layouts is to provide a setting for each story to dramatize it for 1) instant evaluation as to personal interest and 2) easy, time-saving reading. This means a balance of text, photos, diagrams, and color.

We're fortunate in having the "acreage" available — in our square-format magazine — to help make these editorial "displays" attractive. Two facing pages provide us with a "plot" more than 22" long and 11" high . . . lots of room with which to work in layout.

You'll get an idea of what we mean by looking at the eight pages starting with page 12.

There's more "editorial landscaping" like this coming up in future issues.

H. W. Lichtenberger

ART EDITOR

. . . and it still makes sense today!

Occasionally, a new reader will ask our editors, "Why is **CHEMICAL PROCESSING** so large? Isn't it much more expensive to produce and print than the common, smaller-size magazines? (It is.) What's the purpose of this 'different' size?"

And nothing pleases Art Editor Harley Lichtenberger more than a chance to answer just these questions.

"The wide, 'cinemascope' spreads," Harley explains, "give us the opportunity to use photographs, drawings, and other artwork to the fullest advantage. And this additional 'acreage' . . . almost two square feet in all . . . serves two purposes.

"First of all, the additional 'acres' allow the reader to *immediately* evaluate his own personal interest. Second, the bigger pictures show more . . . they bring the reader that much closer to the scene."

And Harley's thoughts reflect the thinking of all the **CHEMICAL PROCESSING** Editors . . . a *closer* look at *more* pictures and drawings, . . . one of the many ways that **CHEMICAL PROCESSING** Magazine is different.

THE EDITORS

Clipped from August 1955
CHEMICAL PROCESSING

As **SIMPLE** and
Dependable
as the Pull of a
MAGNET!



A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL

The Simplest, Most Versatile
LIQUID LEVEL CONTROL
Ever Devised!

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life*, with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft. — with single or multi-stage switching.

MAGNETROL, Inc.

● SEND COUPON FOR DETAILS

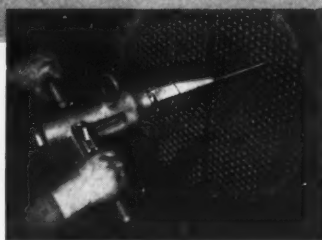
MAGNETROL, Inc. 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on
Magnetrol Liquid Level Control.

Name _____
Company _____
Address _____
City _____ State _____ Zone _____

When inquiring check 3653 opposite last page

Keep Heat Exchangers on the Line with
WILSON
Maintenance Tools

**Heavy-Duty
 TP-301
 Cleaner**



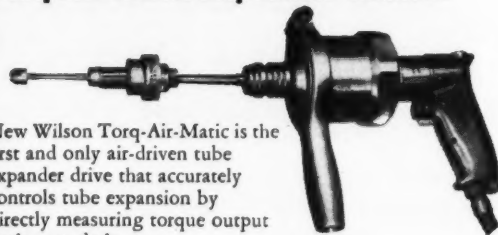
Positive air-driven, hollow rotary shaft, drill type tool. Tube is scavenged with air or water while cleaning.

Tube Expanders



Wilson Models 41 and 44 Tube Expanders incorporate an improved, adjustable ball bearing thrust collar and are designed for efficient, easy rolling and maximum roll length adjustment for various tube sheet thicknesses.

Torq-Air-Matic Expander Control



New Wilson Torq-Air-Matic is the first and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel.

Tube Cutter



Wilson tube cutter is easy to use and does a fast job. Cutter sizes and shanks available to meet all heat exchanger requirements.

Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88.

Representatives in principal cities
 Thomas C. Wilson, Inc. • 21-11 44th Ave., Long Island City 1, N. Y.
 Cable address: "Tubeclean", New York

WILSON

TUBE CLEANERS • TUBE EXPANDERS

When inquiring check 3654 opposite last page

new literature

**Describes 16 fungicides
 and preservatives**

Four-page technical bulletin gives details on 16 industrial fungicides and preservatives. They are used for preservation of edible products, disinfectant uses, germicides, pharmaceuticals, surface coatings, textiles, and leather applications. Physical properties, activities, and use information are given.

Bul No. i-242-E is issued by Chemo Puro Manufacturing Corp., Dept. CP, 150 Doremus Ave., Newark 5, N. J. When inquiring check 3655 on form opposite last page.

**Use of automatic recording device
 speeds spectral testing valve**

Recording device for automatic measurement and permanent recording of surface qualities is described in six-page bulletin. Information on how device, used with variety of exposure heads, can make quick, automatic, and recorded measurements of gloss, haze, transmittance, reflectance, color and other spectral values is reported.

Bul 167 is issued by Gardner Laboratory Inc., Dept. CP, Bethesda 14, Md. When inquiring specify 3656 on form opposite last page.

**Centrifugal pump for flooded-suction
 and suction-lift operation**

Self-priming, vertical centrifugal pump that can be used for flooded suction as well as suction lift is discussed in 12-page bulletin. Construction of pump, which does not use stuffing box, shaft packing, or mechanical seals in running contact with liquid, is illustrated and explained. Instructions for installation and care are accompanied by labeled drawings and parts list. Additional useful information is presented in form of chart which details friction of water in pipes.

Bul G-1 is issued by The LaBour Co., Inc., Dept. CP, Elkhart, Ind. When inquiring specify 3657 on form opposite last page.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of the magazine

**Helps to clarify new trends
 in management thinking**

Management methods have been changing rapidly. The creative manager can contribute significantly to the success of his organization by being aware of new forces and their implications. To clarify these new trends in management thinking, 55-page publication presents a useful theory of management based on integration of motivation research with existing theories of scientific management. Insights obtained from research in leadership, performance goals, and other motivational factors are applied to all company functions to form more harmonious patterns of operations.

To obtain General Management Series 182 remit \$1.75 (AMA members \$1.00) direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. When inquiring specify 3658 on form opp. last page.

**Gives details on gross weigher
 for handling sticky materials**

Automatic gross weigher for push-button weighing of adhesive materials is described and illustrated in six-page, two-color bulletin. Line drawings show various arrangements of equipment for handling different types of material. Dimensional drawing of scale and list of accessory equipment are included.

Bul 0356 is issued by Richardson Scale Company, Dept. CP, Van Houten Ave., Clifton, N. J. Specify 3659 opposite last page.

Ultrasonic generators, transducers

High power ultrasonic generators and transducers, are described in two-page bulletin. Details of how two generators can be applied for powering large-scale, high-volume batch or automated ultrasonic cleaning, machining and liquid processing systems are provided. Typical tank arrays are illustrated, and specifications given.

Bul DR-2000 is issued by Acoustica Associates, Inc., Dept. CP, Glenwood Landing, Long Island, N.Y. Specify 3660 opposite last page.

Data on chemical reaction studies to conquer air pollution

Papers and comments summarizing present knowledge in fields of photochemistry and gas-phase reaction kinetics in relation to the air pollution problem in Los Angeles area are presented in 136-page report.

To obtain Report 15 "Conference on Chemical Reactions in Urban Atmospheres" remit \$5.00 direct to Air Pollution Foundation, Dept. CP, 704 S. Spring St., Los Angeles 14, Calif. When inquiring specify 3661 on form which is located opposite last page.

Tells of glass fiber insulation for acoustical, thermal use

Three kinds of flame-blown glass fiber insulations for thermal and acoustical applications are described in six-page brochure. Charts indicate acoustical and thermal values. Brochure also describes plastics-reinforcing products, textile yarns, and mat products of company.

Brochure WPD-12 is issued by L.O.F Glass Fibers Co., Dept. CP, 1810 Madison Ave., Toledo 1, Ohio. When inquiring specify 3662 on form opposite last page.

Describes shell-and-tube heat exchangers

Construction features, general specifications, and standard materials for line of shell-and-tube heat exchangers are described in four-page bulletin. Data are presented in tabular form for easy reference.

Bul HE-1 is issued by Heat Transfer Co., Dept. CP, 145 Sussex Rd., W. Englewood, N.J. When inquiring specify 3663 on convenient Reader Service slip opposite last page.

Organolithium compounds in organic synthesis

Abstracts of 271 articles on use of organolithium compounds in organic synthesis are given in this 124-page book. Articles were published during 1954 and 1955. A 32-page index is included.

"Bibliography on Use of Organolithium Compounds, Sup. No. 4" is issued on direct letter-head request to Lithium Corporation of America, Inc., Dept. CP, Rand Tower, Minneapolis 2, Minn.

MARLEY IS STILL TESTING TOWERS

Here are the current results—a consecutive list of ALL acceptance tests conducted by Marley during 1956 on Cross-Flow industrial towers. Although towers tested were of many sizes and capacities, operating under varying conditions and in various parts of the country, there is one "common denominator" in all the tests—the positive performance of Marley cooling towers. Better than words, better even than written guarantees, these tests are your assurance of complete performance satisfaction when you purchase a Marley cooling tower.

The Marley Company has long pioneered the policy of "test your tower," for we believe that every purchaser is entitled—if not obligated—to know the performance of his tower in exact and authoritative terms. We also believe that every prospective purchaser is entitled to know the performance record of Marley towers, and for this reason have consistently published the results of Marley's own tower-testing program.

If you'd like to know the Marley method of measuring performance of cooling towers, regardless of make or vintage, we invite you to write for our technical publication, "TEST YOUR TOWER."



TEST NO.	TYPE OF SERVICE AND LOCATION	SPECIFIED CONDITIONS				TEST RESULTS	
		Gallons Per Minute	Hot Water Temp.	Cold Water Temp.	Wet Bulb Temp.	Degrees Cold Water Temp.	Percent Capacity
1	Generating Station—North Central	49,200	100.8°	85°	74°	+26°	+2.3%
2	Generating Station—Southwest	28,000	99.5°	83°	74°	+15°	+1.5%
3	Chemical Plant—East Coast	33,000	105°	86°	81°	+43°	+12.7%
4	Generating Station—Mid-West	62,400	107.5°	90°	76°	+02°	+1.3%
*5	Petrochemical Plant—Mid-West	10,000	105°	83°	76°	—25°	—2.14%
6	Petroleum Refinery—Mid-West	8,500	120°	85°	76°	+15°	+1.35%
7	Generating Station—Mid-West	26,000	110°	91°	75°	+70°	+3.4%
*8	Petroleum Refinery—Gulf Coast	21,000	113°	90°	80°	—45°	—2.85%
9	Petrochemical Plant—Gulf Coast	6,000	105°	85°	80°	+06°	+6.9%
10	Petrochemical Plant—East Central	21,000	120°	85°	73°	—2°	—1.5%
11	Generating Station—Southwest	38,700	93°	78.5°	65°	—4°	—2.15%
*12	Generating Station—North Central	7,180	101°	87°	74°	+1°	+7.7%
13	Generating Station—East Coast	26,400	96°	86°	79°	+30°	+4.17%
14	Petroleum Refinery—Mid-West	8,000	120°	84°	74°	+70°	+6.4%

★ Tested in accordance with Cooling Tower Institute test procedure ATP-105 and observed by CTI representative.

FOR YOUR FREE COPY,
MARK AND MAIL THE COUPON TODAY



The Marley Company
Kansas City, Missouri

Technical Services Dept.,
The Marley Company
222 W. Gregory Blvd.
Kansas City, Mo. 210

Please send me a copy of your brochure, "TEST YOUR TOWER."

Name.....

Firm.....

Address.....

City..... State.....

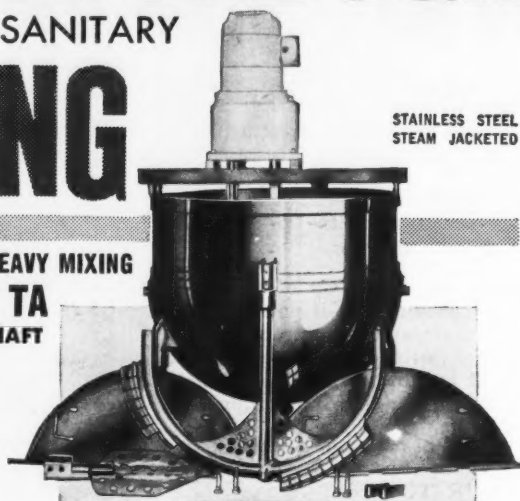
When inquiring check 3664 opposite last page

EITHER OF THESE UNITS ASSURES

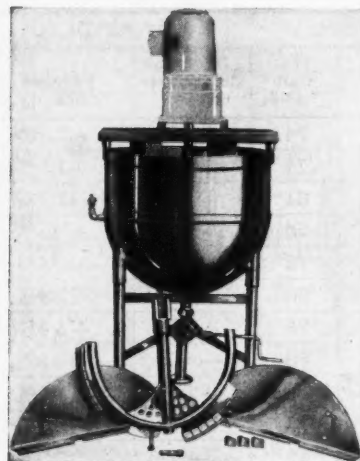
Really THOROUGH SANITARY MIXING

FOR EXTRA HEAVY MIXING
Model TA
TWIN-SHAFT

FOR MEDIUM TO
HEAVY MIXING
Model RA



STAINLESS STEEL
STEAM JACKETED



ALL AGITATOR PARTS
QUICKLY REMOVABLE
FOR EASY CLEANING

ENGINEERING ANALYSIS AND ADVICE ON YOUR PROBLEMS

Cooking and/or mixing problems of unusual natures sometimes baffle standard processing units. When you have such a problem, put it up to GROEN's highly experienced Engineering Dept. Prompt action. No obligation.

Consistently finer mixing... really thorough mixing... and at lower cost... is being realized daily in hundreds of leading chemical plants through either or both of these new GROEN stainless steel steam jacketed cooker-mixers. Both typify advanced engineering to the top degree. They're new in design... new in the precision of their performance... new in the simplicity with which they can be operated. ● For example: all agitator parts in either model can be removed in seconds for easy cleaning. Credit this to the exclusive GROEN demountable shaft coupling which despite its uncomplicated design, cannot disengage in operation. This feature subtracts substantially from "down" time. ● Both models employ the GROEN anchor type agitator frame equipped with special flexible finger-like scrapers positioned to control all contents continuously, compelling complete agitation. ● Read the full, interesting details in our Bulletins RAK-2 and TAK-2. Write us for these today. Also ask for Bulletin RT-1 about the special GROEN ROTA-THERM JACKET for super-speed cooking. Produces highest speed ever attained in any cooking unit.

Write Us Today!

GROEN MFG. CO.

DEPT. CP-57

4535 W. ARMITAGE AVE. CHICAGO 39, ILL.

30 CHURCH STREET, NEW YORK 7, N. Y.

Half a Century of Fine Kettles

When inquiring check 3665 opposite last page

NEW LITERATURE

Depicts control panels for special service

Bulletin of 12 pages in two colors shows control panels designed for special service. Application information and benefits of engineering assistance, design, and field service are given.

Bul GEA-6334 is issued by General Electric Company, Dept. CP, Schenectady 5, N.Y. When inquiring specify 3666 on form which is located opposite last page.

Describes rods and tubes made of nylon

Typical properties, standard sizes, and applications of nylon rod, tube, and fabricated parts are described in four-page bulletin. Abrasion and chemical resistance are pointed out.

Bul N-1056 is issued by United States Gasket Plastics Div. of the Garlock Packing Co., Dept. CP, 600 N. 10th St., Camden 1, N.J. When inquiring reader may simply specify 3667 on form opposite last page.

Laboratory equipment book has interesting articles

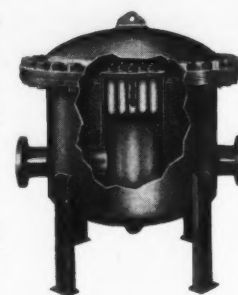
Descriptions and photographs of new and redesigned instruments and apparatus for laboratory use are contained in 30-page booklet. Equipment such as electric incubators, moisture determinator, vapor pressure apparatus, and centrifuge are listed. Booklet also contains group of interesting articles including portrait of Edwin J. Cohn, noted authority on chemistry of blood and blood fractionation, and an article on paper chromatography.

"Cenco News Chats" #83 is issued by Central Scientific Co., Dept. CP, 1700 Irving Park Rd., Chicago, Ill. When inquiring specify 3668 on form opposite last page.

The Problem of Oil Vapor ... and how to solve it!

Manufacturers of chemicals, pharmaceuticals; users of pneumatic instrumentation; processors of foodstuffs... all encounter critical procedures wherein hydrocarbon vapor in compressed air and process gas streams produces adverse results:

Aeration and agitation of liquids
Air-cleaning of containers
Protection of
desiccants for dehydration



**SELAS
VAPE-SORBER**

The Selas Vape-Sorber, effectively combining principles of liquid-gas separation and high capacity oil adsorption, completely removes hydrocarbon vapors, dirt and liquid-phase entrainment of every kind. Its compact, welded steel construction contains no moving parts, requires minimum maintenance.

Send for your free copy of this new Vape-Sorber booklet No. 115. It describes, by chart and table, the exact size and model for your requirements.



SELAS CORPORATION OF AMERICA
Heat and Fluid Processing Engineers
DRESHER, PENNSYLVANIA

When inquiring check 3669 opposite last page

measuring

pattern

distribution

to improve
SPRAY NOZZLE
PERFORMANCE

With the distribution table, spray uniformity is a measurable quantity... and the effects of nozzle design can be accurately tabulated. Here is but one instrument among many used in Spraying Systems research to give you better spray nozzle performance. May we send you complete information?

WRITE FOR
CATALOG

24

SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET
BELLWOOD, ILLINOIS

When inquiring check 3670 opposite last page

CHEMICAL PROCESSING

**Portable indicators
for thermocouples**

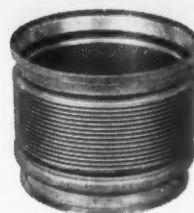
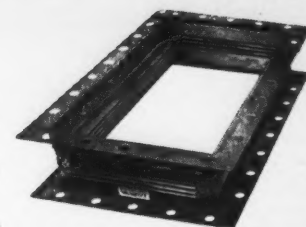
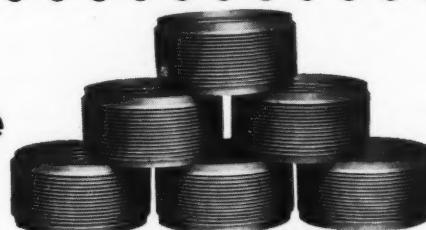
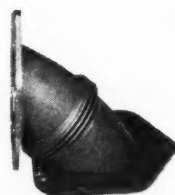
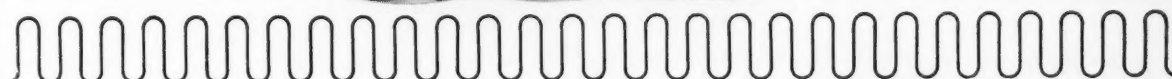
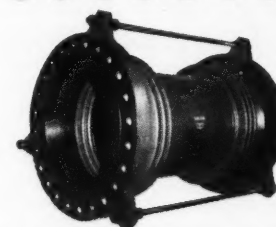
Publication describes portable, direct-reading potentiometer with automatic reference-junction compensation. Specifications and set-ups for narrow- and wide-range temperature readings are given.

Data Sheet ND42-33(1) is issued by Leeds & Northrup Co., 4924 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3671 on form opposite last page.

**Summarizes fabric development
and tells specialized uses**

Composition, uses, and special applications of textiles combined with other materials, such as rubber, plastics, and special-purpose compounds, are described in well-illustrated, 24-page booklet.

"Fabrics Plus" is issued by Wellington Sears Company, Dept. CP, 65 Worth St., New York 13, N. Y. When inquiring specify 3672 on form opposite last page.

**Sola-Flex****bellows****and expansion joints****are made****in all sizes****and varieties**

BIG OR LITTLE, round or square, convoluted or U-span—no matter what kind of expansion joints you need, Solar can build them. Sola-Flex joints are durable, economical, and are based on advanced engineering designs using a wide variety of metals. High or low pressure piping problems are easily solved with Sola-Flex bellows. Ask for our latest catalog. Write Dept. D-17, Solar Aircraft Company, San Diego 12, Calif.

SOLAR
AIRCRAFT COMPANY



Designers, Developers and Manufacturers • Gas Turbines • Aircraft and Missile Components • Bellows • Controls • Coatings • Metal Alloy Products



When inquiring check 3673 opposite last page



REMOTE TEMPERATURE CONTROLLER

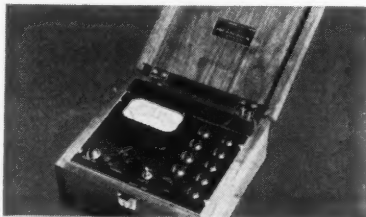
Sensitive to $\pm 1^\circ\text{C}$. within range of -65° to $+115^\circ\text{C}$.

When you must maintain close control over the temperature of a substance located at some distance from your base of operations, the ideal instrument is the Bendix* Remote Temperature Controller. Designed for either laboratory or industrial use, the Controller will automatically maintain temperatures within one-tenth degree C. of the desired setting. Highly sensitive and ruggedly constructed, it is equipped with a temperature-sensing thermistor probe which will operate as much as several hundred feet from the Controller itself. This permits maintenance of temperature control over substances stored far from the centrally located control unit.

On-off control is automatic. If the temperature of the remote probe varies from the value set on the Controller's dial, the unit automatically

activates cooling or heating equipment to correct the variation.

If you must maintain constant temperatures in substances some distance from your normal working location, you need the Bendix-Friez Remote Temperature Controller. For complete operating information, write Bendix-Friez, 1450 Taylor Ave., Baltimore 4, Maryland.



PORTABLE REMOTE TEMPERATURE INDICATOR
This unit will give you immediate temperature readings at as many as nine different probe locations. Saves cost of nine permanently installed temperature indicators. It operates at the flick of a switch and is effective at distances up to several thousand feet.

*REG. U.S. PAT. OFF.

**Friez Instrument
Division**



When inquiring check 3674 opposite last page

NEW LITERATURE

Materials comparator chart for phenolic laminates

Basic materials comparator chart, 11 x 17" size, aids in solving design problems concerning phenolic laminated plastic and vulcanized fiber. Chart lists chemical, electrical, fabrication, mechanical, and physical properties. Comparative prices are included.

Basic materials comparator chart is issued by National Vulcanized Fibre Co., 1056 Beech St., Wilmington 99, Del. When inquiring specify 3675 on the convenient Reader Service slip opposite last page.

Durable protective coating cuts maintenance costs

Thin, essentially inert, silicate-modified protective coating to control corrosive elements in industrial property and products is detailed in four-page bulletin. What can coating do? Where is it used? How does it give protection? These are some of questions answered in bulletin.

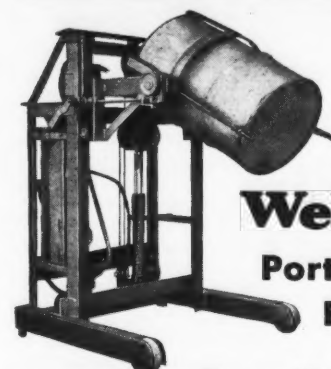
"Profilm" is issued by Allied Porcenell, Inc., Dept. CP, 851 S. Market St., Waukegan, Ill. When inquiring specify 3676 on form which is located opposite last page.

Details properties, uses of vegetable colloid

Physical and chemical properties of manufacturer's line of processed guar gums are detailed in 16-page booklet. Information on Food and Drug standards concerning product, methods of handling, types available, and applications are also covered.

"Jaguar Guar Gum" is issued by Stein Hall & Co., Inc., Dept. CP, 285 Madison Ave., New York 17, N.Y. When inquiring reader may simply specify 3677 on the convenient Reader Service slip which is located opposite last page.

Simplify, Speed Up DRUM HANDLING



with
New

Weld-Bilt Portable Drum Elevator



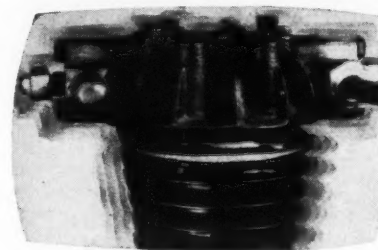
You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on
this important time
and labor-saver.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

When inquiring check 3678 opposite last page



VIBRATION
DOES NOT
CRACK OR
FISSURE THE
PLASTIC SEAL

for those hard-to-hold liquids and gases

Leak Lock is a truly remarkable joint sealer, as its plastic base holds chemical solutions and gases that quickly penetrate ordinary sealers.

Leak Lock adheres firmly to most surfaces - steel, iron, copper, aluminum, cork, asbestos, plastics, etc., and stays flexible indefinitely. It is the real answer to those difficult leaking joint problems. Stewart Industries, Inc., 16 Colfax Ave., Clifton, N. J.

Send for FREE
SAMPLE for
test purposes

Leak Lock

When inquiring check 3679 opposite last page

CHEMICAL PROCESSING

Reagents, other chemicals for lab, related uses

Digest-size catalog of 92 pages lists manufacturer's line of reagents and other chemicals for laboratory and related uses. Prices for all products are stated. Tables of international atomic weights and weight-volume comparisons are included.

Cat 56 is issued by J. T. Baker Chemical Co., Dept. CP, Phillipsburg, N.J. When inquiring specify 3680 opposite last page.

How to operate lift truck is subject of booklet

Two-color cartoon technique is used for presenting instructions on operation of lift trucks, preventive maintenance, safety, and basic material handling. Booklet of 24 pages is written for both beginner and experienced operator. Drawings for setting up obstacle course are included.

"How to Operate a Lift Truck" is issued by Hyster Company, Dept. CP, 2902 NE Clackamas St., Portland 8, Oregon. When inquiring specify 3681 on form which is located opposite last page.

Data on four tertiary-alkyl primary amines

Booklet of 36 pages presents data on four tertiary-alkyl primary amines available from manufacturer. Physical and chemical properties, suggested applications, and chemical reactions for *t*-butylamine, *t*-octylamine, Primene 81-R, and Primene JM-T are defined.

"Tertiary-Alkyl Primary Amines" is issued by Rohm & Haas Co., Dept. CP, Washington Sq., Philadelphia 5, Pa. When inquiring specify 3682 on the convenient Reader Service slip opposite last page.

Aid to draftsmen

Tracing templates to aid draftsmen in drawing valves are provided without charge by manufacturer. Templates, containing top, side, and front views of 24 valves, are in one-quarter, one-half, and full size.

Templates are offered by Ross Operating Valve Co., Dept. CP, 120 E. Golden Gate Ave., Detroit 3, Mich. When inquiring specify 3683 on the convenient Reader Service slip which is located opposite last page.



About the Cost of Living...with Steam Traps

WHEN YOU specify steam traps, what could possibly be more important than *the cost of living with them*—production cost... steam cost... downtime cost... repair cost.

No steam traps manufactured have ever provided greater equipment operating efficiency or lower trap maintenance cost than Armstrongs.

Consider the experiences of these companies:

"30% Greater Output from platen presses since installing Armstrong Traps"—rubber processor.

"\$8000 Annual Fuel Saving since replacing 600 traps with Armstrong"—metal processor.

"30% Less Downtime for repairs with Armstrong Traps"—food processor.

"\$25,000 Trap Maintenance Saving every year since installing 4000 Armstrong Traps"—major chemical plant.

You may well ask, "Can there really be so big a difference in steam trap performance?" The answer is: These are typical experiences of people who have compared Armstrong trap performance—not for a month or a year, but over periods of 2, 5 and even 10 years or more.

The Armstrong trap has certain fundamental advantages, including:

No Steam Loss—the valve is always water-sealed.

Large air-venting capacity—air is automatically discharged along with condensate.

Long-life parts—hardened chrome steel valve and seat—all other parts corrosion-resistant stainless. Absolu-

tely nothing to stick, bind, clog or collapse. Not affected by ordinary dirt and scale.

Unconditionally guaranteed to satisfy. It takes an awfully good product to carry such a guarantee.

Steam traps can have such a big effect on plant operating efficiency, they are worth more than casual consideration. Let your Armstrong Factory Representative answer your questions. There is no obligation. Call him or write:

ARMSTRONG MACHINE WORKS
8803 Maple Street • Three Rivers, Mich.



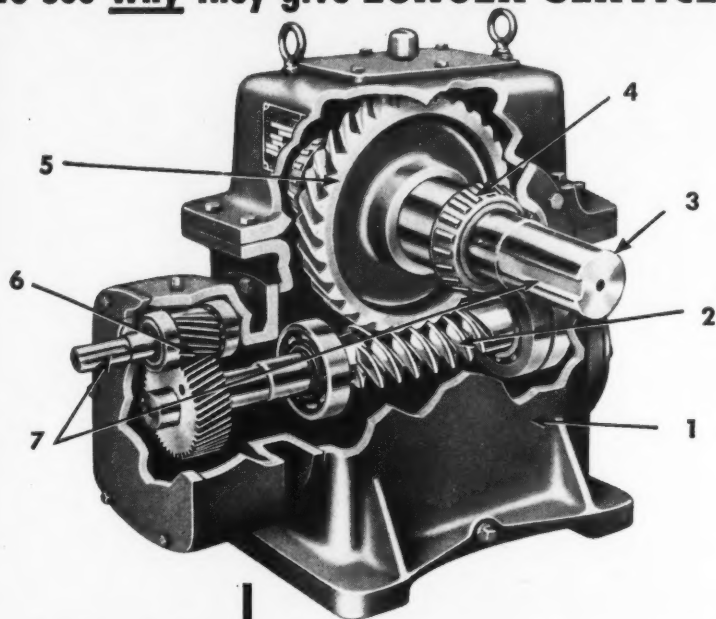
Do you have "The Steam Trap Book"?—44 pages of useful data on trap sizing, calculation of condensate loads, installation and maintenance. Free on request.

ARMSTRONG STEAM TRAPS

When inquiring check 3684 opposite last page

Look Inside a Foote Bros.

ENCLOSED WORM GEAR DRIVE to see why they give **LONGER SERVICE**



1 EXTRA STRONG CAST HOUSING

Provides rigid mounting and alignment of caps and bearings. Made of high quality cast iron.

2 PRECISION ALLOY STEEL WORM

Integral with oversize shaft. Carefully matched to worm gear for quiet, trouble-free service.

3 OVERSIZE OUTPUT SHAFT

4 HEAVY DUTY, EXTRA LARGE BEARINGS

Oversize bearings used throughout unit. Worm bearings are combination single row radial and angular contact ball bearings. Input shaft bearings are single row radial type.

5 WORM GEAR

Precision generated from uniform density, high hardness virgin bronze alloy casting. High load carrying capacity.

6 HEAT TREATED HELICAL GEARS

Shaved for full tooth contact. Pinion integral with input shaft. Gear locked in position on worm shaft extension.

7 JUST ONE OF 10 DIFFERENT TYPES, IN A WIDE RANGE OF SIZES, RATIOS AND SHAFT ARRANGEMENTS.

One look at the oversize bearings, larger shafts, precision made gearing and the sturdy housing of a Foote Bros. Hygrade Worm Gear Drive tells you that this is a workhorse unit that will stand up and deliver under the toughest conditions.

Notice the carefully balanced design . . . greater mass where it's needed . . . the elimination of weight when it contributes nothing to efficiency . . . strength and toughness at the right places . . . the correct gear alloys . . . the compact design, and above all, the simplicity and ruggedness of this unit.

When you know the *inside* story of Foote Bros. Hygrade Worm Gear Drives, you can understand why they have built a reputation for quality, dependability, and performance that is unmatched by others.

Call in a Foote Bros. Field Engineer. Take advantage of our long experience in this business. Let us help you select or specify the most economical drive for your application.

Write for Engineering Manual HGB. It contains complete information on Hygrade Enclosed Worm Gear Drives.



FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
4555 South Western Boulevard Chicago 9, Illinois

this trademark stands for the finest industrial gearing made



T. M. REG. U. S. PAT. OFF.

NEW LITERATURE

Pocket-size data sheet covers sesame oil

Average characteristics, specifications, and application information on sesame oil USP are presented in pocket-size data sheet of four pages.

"Sesame Oil USP" is issued by Welch, Holme & Clark Co., Inc., Dept. CP, 1 Hudson St., New York 13, N.Y. When inquiring specify 3686 on form opposite last page.

Folder shows controlled temperature, compact hydraulic presses

Folder of eight pages describes and illustrates bench and floor hydraulic presses for laboratory testing and rubber and plastic molding. Data including size, capacity, and power requirements are listed for all models.

"The PHI Press" is issued by Pasadena Hydraulics Inc., Dept. CP, 1433 Lidcombe, El Monte, Calif. When inquiring specify 3687 on form opposite last page.

Here's catalog, file folder on urethane polymers

Combination catalog and file folder on urethane polymers, contained in 9 x 12 brochure, can be easily kept up to date. File section has eight pages of information on two-liquid component formulations. As additional data are released, they can be added to file. Booklet explains how custom formulations are created. It also covers in-plant applications, electrical properties, bonding and adhesion, impact absorption, and strength properties.

Catalog-file is issued by Dayton Rubber Co., Dept. CP, Dayton 1, Ohio. When inquiring specify 3688 on form opposite last page.

NEW POCKET CALCULATOR For Liquid Batch Mixing

CAPACI-DIAL for PNEUMIX AGITATORS

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



The attached coupon will get you one without obligation.

ECLIPSE AIR BRUSH CO.
308 Park Ave. Newark 7, N.J.

Please send free CAPACI-DIAL to:

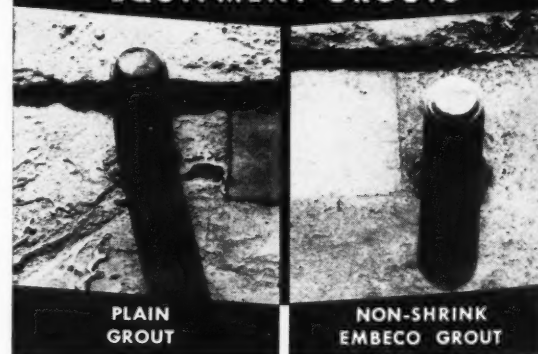
Name

Company

Address

When inquiring check 3689 opposite last page

COMPARE EQUIPMENT GROUTS



... And You'll See Why

EMBECO PRE-MIXED GROUT

gives lasting results on every equipment grouting job. Add only water to Embeco Pre-Mixed Grout, mix and place. Obtain a flowable, non-shrink grout that insures full bedplate contact, maintains alignment, has high impact resistance.

Write for Free Grouting Guide



DIVISION OF AMERICAN-MARIETTA COMPANY

the MASTER BUILDERS co.

CLEVELAND 3, OHIO

TORONTO 9, ONTARIO

When inquiring check 3690 opposite last page

CHEMICAL PROCESSING

When inquiring check 3685 opposite last page

Tells role of plastics in packaging

Booklet of 12 pages shows in words and pictures how polyethylene, styrene, vinyl and phenolic plastics are applied in packaging techniques. Several pages are given to use of plastics as adhesives, coatings, laminations, and molded and extruded containers — as well as signs, displays, and packages made out of vinyl sheet.

"1957 Guide to Improved Packaging" is issued by Bakelite Co., a Division of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify 3691 opposite last page.

Nuclear power plant design described in bulletin

Description of 180,000-kw nuclear power plant to be located near Chicago, Ill., is presented in 25-page bulletin. Detailed information on reactor, turbine plant, auxiliary systems, control and operation, and safety systems is included. Design objective, selection of reactor, and system parameter considerations are discussed.

Bul GER 1301 is issued by General Electric Co., Dept. CP, One River Road, Schenectady 5, N.Y. Check 3692 on form opposite last page.

WANTED:

BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

Worth \$10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for \$10, paid on acceptance.

Worth \$5—Cartoon ideas . . . a written description or rough sketch of scene, and a caption . . . worth \$5, on acceptance.

Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.



Color Coat No. 261 adds lasting beauty to Insul-Mastic Gilsonite protective coatings.

NEW INSUL-MASTIC **COLOR COAT** No. 261 COVERS BLACKEST SURFACES . . .

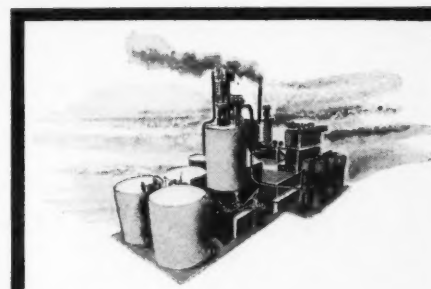
solves these difficult finish problems . . .

ADHESION Color Coat No. 261 is the one finish that will stick to and cover black bituminous mastic coatings, old or new . . . as well as concrete, brick, cinder block, porous roofing tile, asbestos shingles, stucco—and properly primed wood and metal. *Dries in approximately 30 minutes!*

CONTRACTION EXPANSION Color Coat No. 261 leaves a tough pigmented plastic film that flexes with expansion and contraction of base material. *Ideal for color keying service lines!*

DURABILITY Color Coat No. 261 takes weather in stride, and also shows remarkable resistance to sunlight, gases, corrosive fumes, cleaning compounds and many solvents!

FRESH COLORS Color Coat No. 261 is available in Rose, Light Green, Light Blue, Light Yellow, Light Buff, Light Gray, Dark Gray and White—and in an unlimited variety of do-it-yourself colors. *Safe to store and apply!*



What Is Insul-Mastic Color Coat No. 261?

It is a modified acrylic resin dispersion combined with selected chemically inert pigments. Application is economical by conventional spray equipment, brush or roller.

Think first of the coatings that last!



Insul-Mastic

CORPORATION OF AMERICA

7758 WEST 61st PLACE

SUMMIT, ILLINOIS

MAIL THIS COUPON TODAY TO:
INSUL-MASTIC CORPORATION OF AMERICA
7758 West 61st Place, Summit, Illinois

☐ Send Information ☐ Have Representative call

Name _____ Title _____

Company _____

Address _____

City _____ State _____

When inquiring check 3693 opposite last page

FACTORY MUTUAL APPROVED FOR THE ULTIMATE IN SAFETY

NEW

**CHEMICAL
FAUCET FOR
FLAMMABLE
AND
CORROSIVE
FLUIDS**



Kel-F¹ SEALS

FUME TIGHT STAINLESS STEEL¹ FAUCET OVERCOMES SEIZURE PROBLEMS

Here is a faucet designed for minimum maintenance and the ultimate in safety for dispensing solvents, essential oils, chlorine-free bleaches, oxidizing agents, caustic solutions and many acids. They are in use in individual and central dispensing systems in laboratory, production and liquid storage areas throughout the chemical process industries.



Liquid dispensing at an Eastman Kodak storage area. More than 200 solvent storage drums are equipped with Economy chemical faucets.

LOOK AT THESE FEATURES:

- **NO AFTER DRIP** — Kel-F "O" ring seals are inert to chemical exposure.
- **DESIGNED FOR SAFETY** — Anti-flash screen prevents flame propagation in dispensing flammable liquids.
- **EASILY CLEANED** — Disassembled in minutes, the faucet can be chemically and/or steam sterilized.
- **LOW MAINTENANCE** — Corrosion resistance with few moving parts assures long life.
- **FACTORY MUTUAL APPROVED** — Your assurance of quality construction and safe operation.

Write for complete information including detailed test report by Factory Mutual Laboratories.

* Also available in chrome-plated brass † M. W. Kellogg trademark for fluorocarbon resin

ECO ENGINEERING DIVISION
economy FAUCET CO.
12 NEW YORK AVE.
NEWARK 1, NEW JERSEY

When inquiring check 3694 opposite last page

NEW LITERATURE

Bulletin on heat exchanger includes selection chart

Information on external heat exchanger designed to handle acid, salt, and alkaline solutions within temperature range of 35 to 200°F is presented in eight-page bulletin. Data, which include selection chart, cover operation, design, and table of capacity ratings.

"Hi-temp Heat Exchangers" is issued by Nukem Products Corp., Dept. CP, 121 Colgate Ave., Buffalo 20, N.Y. When inquiring specify 3695 on form opposite last page.

Nuclear control system components described

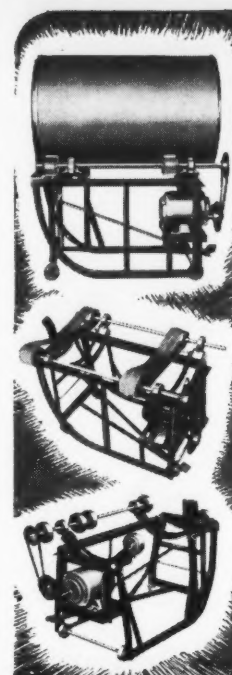
Two types of micro-microammeters for nuclear reactor control systems are described in two-page data sheet. One type of component, with integral range switch and meter, is designed for control panel mounting. Other utilizes bi-directional Ledex mechanism and can be installed remotely from panel.

Data sheet E-03(1) is issued by Leeds & Northrup Co., Dept. CP, 4907 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 3696 on form opposite last page.

Tells preparation, properties of epoxy plasticizers

Methods of preparation and individual properties of several epoxy fatty acid ester plasticizers are described in eight-page bulletin. Plasticizers can be prepared from unsaturated fatty acid esters by epoxidation reactions, using either a preformed peracid such as peracetic acid, or an in-situ technique.

Bul 80 is issued by Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo 7, N.Y. Specify 3697 opposite last page.



**THE NEW "200"
MORSE
PORTABLE
ROTATOR**

**CAN BE ADAPTED
TO MOST
ROTATING JOBS!**

The ROTATOR can easily be moved from one job to another or steered into close quarters. It is available for tumbling fibre drums as well as steel drums from 1 to 55 gallons. Designed by Morse, the ROTATOR has many practical uses and has been found to pay for its low cost many times over. This Portable ROTATOR meets today's ever-present need to save time and labor.

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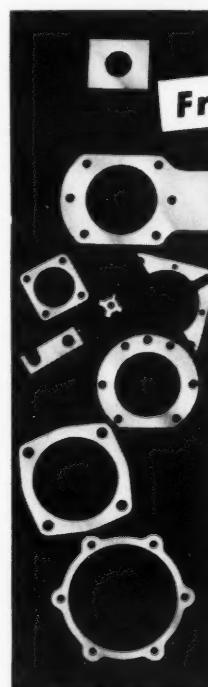
MORSE MANUFACTURING CO., INC.

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When inquiring check 3698 opposite last page

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Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . and in quantities to meet your production requirements.

Write for catalog and submit your specifications for quotation.

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When inquiring check 3699 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Data bulletin on ethylene oxide

Analytical procedures, physical and chemical properties, and industrial uses of ethylene oxide are in 44-page technical bulletin. Along with ten graphs of physical properties, data are included on handling techniques and toxicity, as well as specifications. Bibliography listing 489 references is also given.

"Ethylene Oxide" is issued by Jefferson Chemical Co., Inc., Dept. CP, PO Box 303, Houston 1, Texas. Specify 3700 opposite last page.

Explains motor-control functions

Operation and application manual of 32 pages covers control devices for electric motors. Motor control — what it is, how it works, what controlling devices are available and where to use them — is explained. Manual, magnetic, and reduced-voltage starters; pushbuttons; relays; limit switches; solenoids; pressure and vacuum, float, and plugging and anti-plugging switches are discussed. All equipment is well illustrated.

GEA-6372 is issued by General Electric Company, Dept. CP, Schenectady 5, N.Y. When inquiring specify 3701 opposite last page.

Describes line of chemicals for paint industry

Manufacturer's chemical processing specialties are described in 12-page, pocket-size booklet. Anti-foaming agents, pigment dispersing agents, freeze-thaw stabilizers, thickener, viscosity stabilizer, surface-active agents, and stearates are discussed.

"Chemicals for the Paint Industry" is issued by Nopco Chemical Company, Dept. CP, Logan and Davis Sts., Harrison, N. J. When inquiring specify 3702 opposite last page.

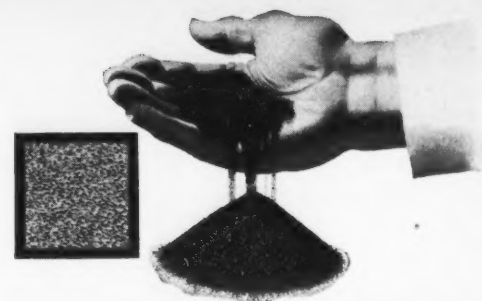
Have you wondered...

... why this magazine has a "different" shape? CP Art Editor Harley Lichtenberger reveals how the large page size allows "editorial landscaping" for most effective presentation.

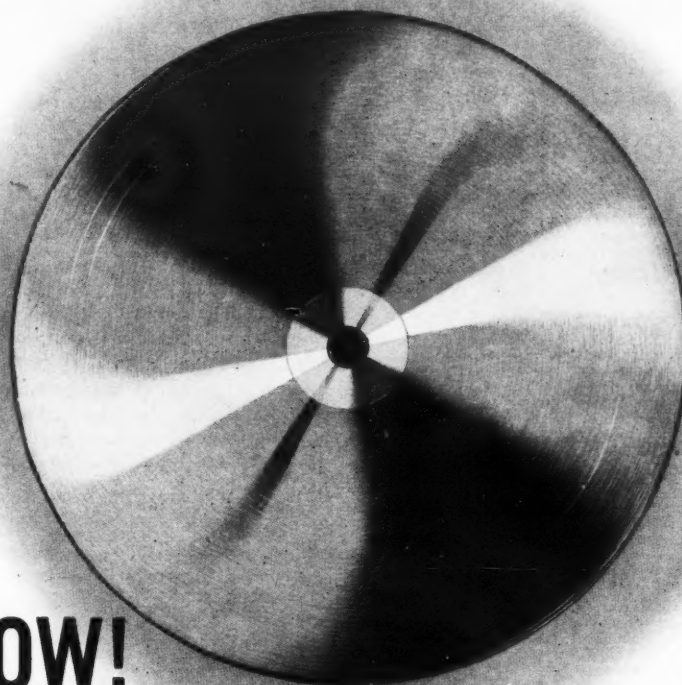
... on page 213



First to lithograph drums



First to shot-blast drums



NOW!

New Rheem Centrifugal Sprayer gives you a lining completely uniform drum after drum after drum

Now, from Rheem who pioneered the improvement of drum exteriors by multi-color lithography, comes a new improvement for lining drum interiors. It's Centrifugal Spray Coating which, with Rheem high temperature curing, assures a new high in quality linings.

This method applies lining materials to drum shells without skips or misses. Every lining is completely uniform on all surfaces—won't vary from one drum to the next, one day to the next.

Above, you see the wheel-shaped business end of this new sprayer invented by Rheem. Hundreds of tiny holes puncture the wheel's edge. As this spray wheel enters the drum, it spins at a high, constant speed. The centrifugal force casts off a continuous, uniform curtain of finely atomized lining material.

The drum does not rotate. Only the wheel spins. The spray always travels the same distance to coat the surface. And this, plus the fact that there's no air

used in the spray, eliminates air turbulence. No dust, dirt, or oil get into the linings as they do in linings applied the conventional way. Too, centrifugal spraying minimizes pinholing and blisters caused by evaporation of solvents during curing. For now lining materials with a lower solvent content are used.

With these new developments Rheem again leads the way by perfecting its product to better protect yours. For full details, contact our nearest office.

YOU CAN RELY ON

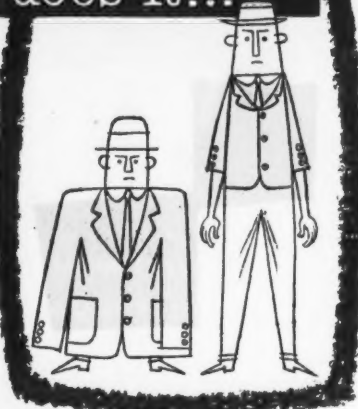


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Rheem Manufacturing Company

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When inquiring check 3703 opposite last page

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Valdura offers maintenance
paints made from specific
resins for every condition

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VAL-CHEM. Versatile, chemical resistant metal primer for use under any finish coat. VALPON ENAMEL. Prevents damage by oils, solvents, alkalis and other chemicals on wood, metal or masonry.

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PARAVAL ENAMEL. Not affected by acids, alkalis and other chemicals. Used on wood, metal, concrete or masonry. RUBBER BASE ENAMEL. Combines excellent exterior durability with high chemical resistance.

BAKELITE

SUPER SERVICE ENAMEL. Resists chemical, moisture and abrasive conditions on metal wood or masonry. ASPHALT ALUMINUM PAINT. 98% waterproof metal coat prevents rust, rot, corrosion. Highest reflectivity.

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SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

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URAVAL. The very latest type of coating that combines the ultimate in resistance to chemicals, solvents, marbling and abrasion. Uraval will stand up where all other types of coating have failed.

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M & F ENAMEL (General Maintenance), VALKOTE (Implement Enamel), DARYWHITE. Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

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AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.
687 Wellington St., Ottawa, Canada

When inquiring check 3704
opposite last page

NEW LITERATURE

**Tells how forests increased by 250%
through use of fertilizer**

Practice of fertilizing forests to increase wood production is considerably more advanced in West Germany than in the United States. Report of 112 pages tells how increased nursery yields of 100 to 400%, and increased yields of forest trees by 150 to 250% were achieved through use of fertilizer and novel methods of application.

To obtain "The Use of Commercial Fertilizers, Particularly Nitrogen, in Forestry" write direct to Dr. E. D. Crittenden, Nitrogen Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. When inquiring specify 3705 on the convenient Reader Service slip which is located opposite last page.

**Annunciator systems —
subject of catalog**

Complete story of annunciator systems is told in 32-page catalog. Fourteen sections discuss company facilities, annunciator function, general features of annunciator systems, industrial applications, operating sequences, mechanical specifications, technical and engineering data, and available remote equipment and components. Numerous photographs and tables aid in descriptions.

Cat 100B is issued by Panellit, Inc., Dept. CP, 7401 N. Hamlin Ave., Skokie, Ill. When inquiring specify 3706 on form which is located opposite last page.

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Would you like to receive your own copy regularly . . . for greater convenience in reading?

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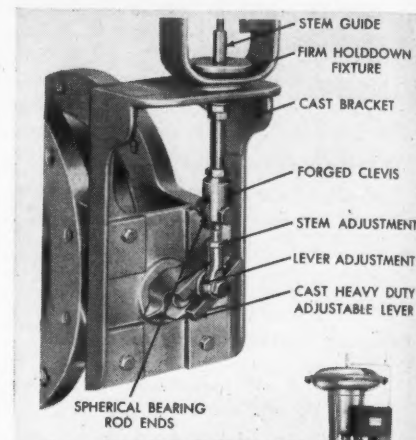
Complete the request-form opposite the last page of this copy and send it along to us — no obligation, of course.

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Standard parts—prompt delivery—maximum flexibility of application make mounting of operator at point of valve installation quick and easy. Made for valves to 48" size.

W. S. ROCKWELL COMPANY — 2207 Eliot Street, Fairfield, Connecticut

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the UNIQUE SOLID-METAL SCREEN

Distinguished for its . . .

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Electro-deposited in pure copper, pure nickel, or nickel-on-copper. Most popular specification, nickel-on-copper can be furnished in lengths up to 100 ft. and widths up to 36" in the following counts — 25, 40, 65, 80 and 100. Nickel-on-copper, as well as pure copper and pure nickel can be furnished in counts ranging from 25 up to 400, but in relatively small size pieces. Write for details. Tolerances on hole size and thickness suitable for the most critical use. LEKTROMESH is ideal for precise filtration, for fabricated products such as fuel filters and electronic shields. For full details let us send our Bulletin on LEKTROMESH. Address Department 27.

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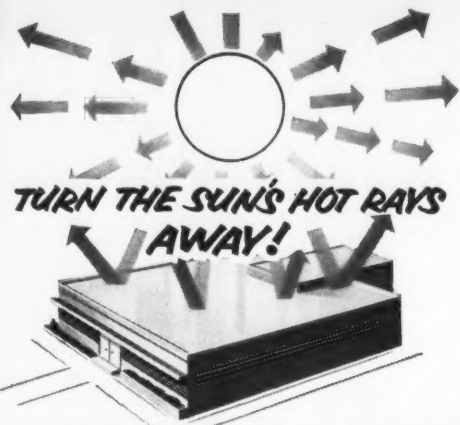


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MANUFACTURING CORP.**

DIPPING BASKETS • WIRE MESH PARTS • WIRE CLOTH
LEKTROMESH • RESISTANCE WIRE • STRAINERS • FILTERS
SOUTHPORT • CONNECTICUT

When inquiring check 3708 opposite last page

CHEMICAL PROCESSING



With TROPICAL ROOF COOLERANT!

Here's low-cost summer cooling for commercial and industrial buildings. Tropical Roof Coolerant coats roofs with a mirror-like metallic surface that deflects up to 70% of the sun's rays. Lowers below-roof temperatures as much as 26°, reduces air conditioning loads up to 25%. Protects against leaks and cracks caused by weather exposure, adds years of life to roofs. No special equipment required. Your own unskilled labor can brush on Coolerant quickly and easily.

FREE! Beat the heat this summer. Send for free bulletin on low-cost Roof Coolerant. Write now!

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the world's most
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catalog of
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LANTERNS
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VALUABLE DATA:

The world's first comprehensive table of lamp and battery operating information
High power searchlights
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Flammable liquid SAFETY CANS
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JUSTRITE Mfg. Co.

2061 N. Southport, Chicago, Ill.

CATALOG NUMBER 569-S5

When inquiring check 3710 opposite last page

NEW LITERATURE

Tells of electric counter for 200 items/min

Two models of electric counter that records up to 200 items per minute are described in one-page reference sheet. Operating advantages are described, and illustration of equipment is included.

Tech Ref 56-C is issued by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. When inquiring specify 3711 on form opposite last page.

Details use of Teflon as steel pipe liner

Application of Teflon-lined steel pipe to combat corrosives and electrical resistance is detailed in two-page bulletin. Specifications, and chemical, thermal, and mechanical properties are listed.

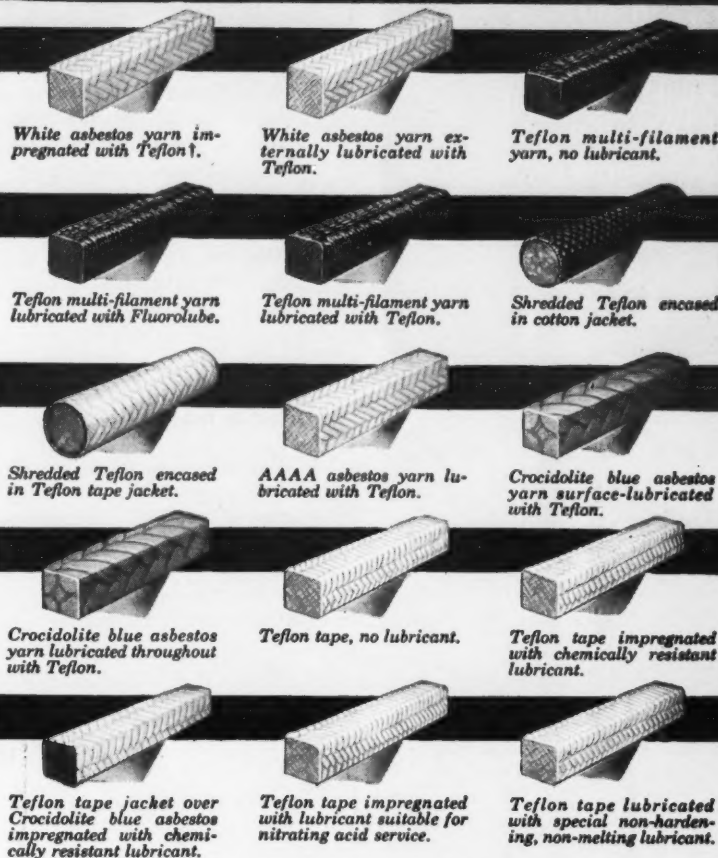
Bul T-100 is issued by Haveg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington 8, Del. When inquiring specify 3712 on form opposite last page.

Summarizes analyzers — oxygen, ultraviolet

Analyzer for measurement of trace amounts of oxygen in gas streams, and ultraviolet analyzer designed for continuous monitoring and control of petroleum and allied processes are summarized in two-page bulletins. Information includes descriptions, applications, and principles of operation. Features are pointed out, and specifications listed.

Bul CEC 1841 (Oxygen) and Bul 1842 (Ultraviolet) are issued by Consolidated Electrodynamics Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. When inquiring specify 3713 on the convenient Reader Service slip which is located opposite last page.

15 SPECIFIC PACKINGS FOR ALL CORROSIVE SERVICES



John Crane CHEMLON* BRAIDED PACKINGS

Specific service conditions are always best handled with a packing designed for the purpose. This is especially true when it comes to the hard-to-handle liquids in the chemical, petrochemical and refinery industries.

For this reason John Crane has developed 15 individual field-proved types of Chemlon Braided Packings. Within this line there is a type and style that will meet any combination of service conditions and requirements.

1. All known industrial acids, alkalis or solvents.
2. Temperatures from -120°F to +600°F.
3. High or low shaft speeds, also valve stems.
4. Longer packing life due to lower coefficient of friction and non-raveling construction.

Send in your service condition and we will recommend a Chemlon Braided Packing best suited to your application. Request Bulletin P-325.

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb).
In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

†T.M. for DuPont Teflon

*T.M. for the Best in DuPont Teflon

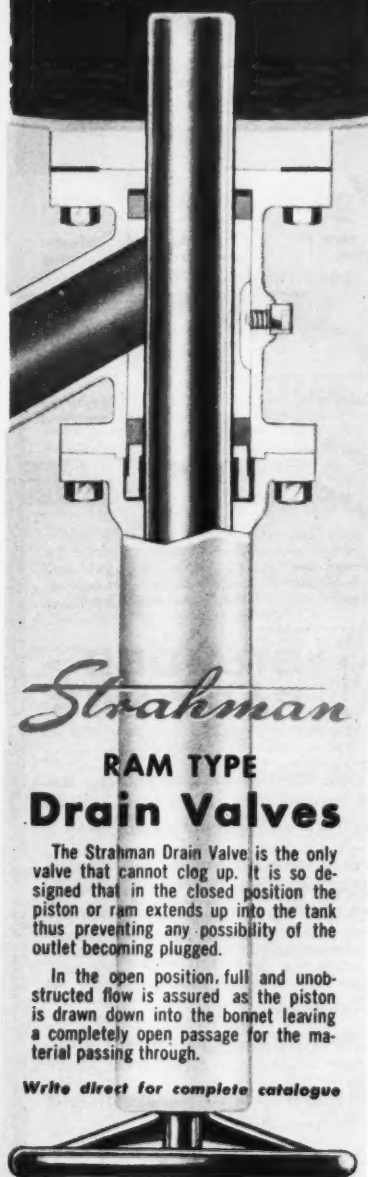


CRANE PACKING COMPANY

When inquiring check 3714 opposite last page

a
FLUSH BOTTOM VALVE
that
WILL NOT CLOG UP!

Designed for Chemical and
Pharmaceutical Industries



Strahman RAM TYPE Drain Valves

The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

Write direct for complete catalogue



When inquiring check 3715
opposite last page

NEW LITERATURE

'How to make a thermocouple'

Data book and catalog of 42 pages suggests how to make a thermocouple. General procedure is outlined to cover major considerations involved. Information concerning radiation detectors, resistance bulbs, and other accessories for indicating, controlling, and recording instruments is listed.

F-5228-3 is issued by Wheelco Instruments Division, Barber-Colman Co., Dept. CP, Rockford, Ill. Specify 3716 opp. last page.

Data on temperature controllers listed in fold-out catalog

Physical specifications, performance data, temperature ranges, and other information on complete line of precision thermostats are given in chart form in six-page fold-out catalog. Also listed and described are various modifications and features, such as moisture-proof seals, armored cable, extended shell, temperature-setting knob and dial.

Cat MC-135 is issued by Fenwal Incorporated, Dept. CP, Ashland, Mass. When inquiring specify 3717 on form opposite last page.



"It gives a much steadier reading since I dissolved a couple aspirins in the recording ink!"

Cartoonist Ken Boyea works for Hercules Powder Co., Holyoke, Mass.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR



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Classify practically all
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You get:
• CLOSER SEPARATIONS

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— fines removed as they
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• NO UNDESIRABLE
OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or
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Send now for Catalogue
and Studies in separating
of various materials.

When inquiring check 3718 opposite last page

alphabetical index on page 249

... for alphabetical index of all processes,
materials, services, and equipment discussed in
this issue's editorial columns and advertisements,
turn to page 249. "Quick-locator" starting on that page
was a feature in CHEMICAL PROCESSING years ago.
It means extra work for the Editors,
but it helps you, the reader, in find-
ing what you want ... in a hurry!

Explains theory and features of color difference meter

Data sheet describes color theory, accuracy, and features of automatic color difference meter. Illustrated meter gives three-part numerical comparison of color samples. Data Sheet 10.10-6 is issued by Industrial Division, Minneapolis-Honeywell Regulator Company, Dept. CP, Wayne and Windrim Ave., Philadelphia 44, Penn. When inquiring specify 3719 on form opposite last page.

Photoelectric controllers in industry

Fifteen-page catalog illustrates and describes line of photoelectric devices for production and safety control. Equipment includes high-speed and impulse-actuated units ranging from moderate to ultra sensitivity. Features are beam intensity adjustment, extra-low-voltage connections, dual-filament lamp, and safety relays. Specifications and prices of individual units with various light sources are listed.

Catalog 57 is issued by Autotron, Inc., Dept. CP, Box 722-S, Danville, Ill. When inquiring specify 3720 on form opposite last page.

Features milling equipment and procedures

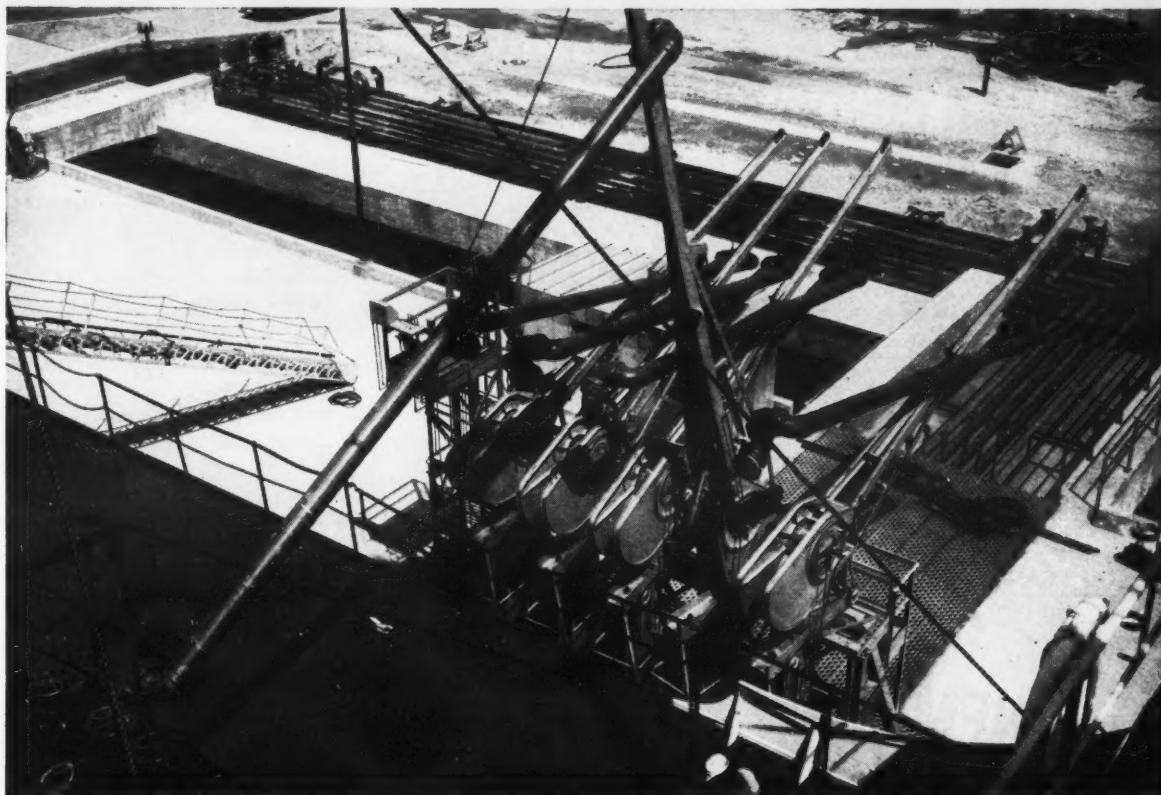
Detailed information on grinding and mixing equipment is contained in 24-page bulletin. Special section provides information on various types of mills, linings, and grinding equipment available, and discusses applications for each type. Bulletin also offers practical suggestions and recommendations to users of this equipment.

Bul 280 is issued by U. S. Stoneware Co., Dept. CP, PO Box 350, Akron, Ohio. When inquiring specify 3721 on form opposite last page.

Process control instruments described in catalog

Indicating, recording, controlling, and transmitting instruments for flow, pressure, density, and chlorination are described in 32-page catalog. Specifications capacities, and prices are included for all instruments.

Cat 2 is issued by Fischer & Porter Co., Dept. CP, 907 Jacksonville Rd., Hatboro, Pa. When inquiring specify 3722 opposite last page.



IN SHIPPING—

CHIKSAN MARINE LOADING ARMS

GIVE A MODERN DAY LIFT TO TANKER LOADING!

Hooking up hose lines to a tanker is often a rough, dirty, and sometimes dangerous task. However, loading drudgery is becoming just a memory wherever the new Chiksan Marine Loading Arm has gone into service. Heralded by many as the first basic improvement in the loading of marine tankers in over 30 years, the new Chiksan Loading Arm not only insures faster tanker turn-around time, but promises material savings of lost man-hours due to hose handling injuries, insurance and compensation premiums, and expensive rubber hose replacements. Savings within a decade, one customer estimates, will actually amount to the purchase price of a 5-arm unit. For descriptive literature, write Chiksan, Brea, California.

Where once a crew of seven men labored for 30 minutes to hook up a rubber line, now one man operating hydraulic controls can swing a Chiksan Loading Arm aboard, for hook up, in less than a minute.



A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



CHIKSAN



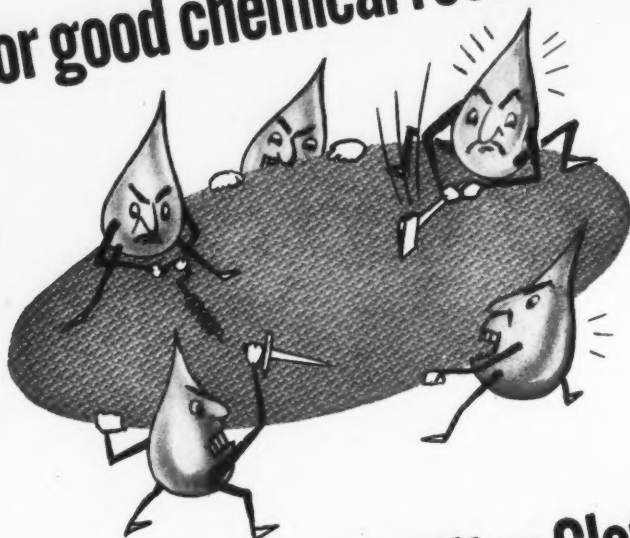
CHIKSAN COMPANY—BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada Ltd.

Please address:
Dept. 175

When inquiring check 3723 opposite last page

For good chemical resistance—



Use NFM NYLON Filter Cloth

NFM Nylon Filter Cloth
is not affected by

Most common alkalis	Alcohols
Most organic acids	Carbon Bisulphide
Halogenated hydrocarbons	Carbon Tetrachloride
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In addition, the fiber strength of Nylon ranks first among all others, whether natural or synthetic. It has excellent heat resistance. It is unaffected by mold, fungi and bacteria growths. The extremely smooth surface of Nylon makes for easy cake discharge—even extremely sticky and tenacious cakes separate freely and cleanly from the face of the cloth. This is important since it reduces blinding and increases flow rates and filter capacity.

We also weave filter cloth of VINCEL[†], SARAN, DYNEL, GLASS, DACRON^{††}, TEFLON^{***}, POLYETHYLENE, ORLON^{*}.

... for your Filter Paper requirements try NETONE Filter Paper. High tensile strength, chemical resistant, high burst factor, abrasion resistant and crease resistant.

Write us for test samples—when you do, tell us about your filter problems.

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When inquiring check 3724 opposite last page

NEW LITERATURE

Resin for polyurethane foam described in folder

How polyurethane foam can be produced in various densities and consistencies by mixing resin and correct catalyst is described in six-page folder. Components, technical data and uses are covered.

"NAFIL" is issued by Chase Chemical Corp., Dept. CP, 3527 Smallman St., Pittsburgh 1, Pa. Specify 3725 opposite last page.

Shows polyethylene fittings

Bulletin of four pages describes and illustrates polyethylene fittings, and waste and drainage systems. Dimensions are provided by table and drawings. Illustrations and description show method of joining pipe and fittings.

Bul 1 is issued by American Vulcathene, Div. of The Nalge Co., Inc., Dept. CP, 625 S. Goodman St., Rochester 2, N.Y. Specify 3726 opposite last page.

Coumarin solubility tables, specifications, in folder

Pocket-size folder of four pages contains solubility tables for synthetic aroma-fixing and odor-making agent.

Coumarin folder is issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. Specify 3727 opp. last pg.

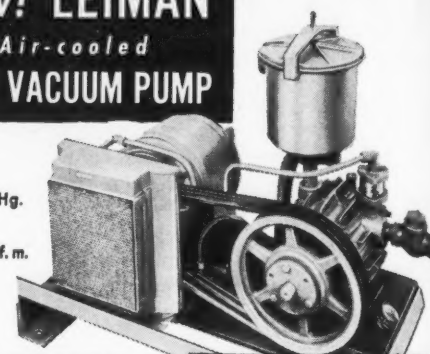
Data on tungsten carbide

Characteristics of manufacturer's tungsten carbide with platinum binder, for severe corrosion conditions, are presented in two-page bulletin. Typical uses, workability, and physical and chemical properties are listed.

Form L-501 is issued by Kennametal Inc., Dept. CP, Latrobe, Pa. Specify 3728 opp. last page.

New! LEIMAN Air-cooled HIGH VACUUM PUMP

VACUUMS
24 to 29.9" Hg.
CAPACITY
15 to 40.8 c. f. m.



Air-Cooled pump operates
24 hours a day at 140°F.

This air-cooled Leiman Rotary Positive High Vacuum Pump gives you greater capacity in a smaller pump—a compact pump unit that can be placed anywhere. It incorporates the Leiman 2-wing rotary pump, with steel blades, cast iron cylinders and patented automatic wing adjuster which assures leak-proof seal for years and years. Put one on test.

Write for detailed folder and prices.


LEIMAN BROS., INC.
220 Christie St., Newark 5, N. J.

FEATURES

- Radiator-cooled lubricating system circulates pre-cooled oil through pump
- Eliminates vapor
- Eliminates water-cooling—piping—leakage
- Can not overheat
- Saves floor space
30" long—27" high—21" wide

Other Leiman Air Pumps:
Vacuums to 29.9" Hg.
Pressures to 20 psig.
Capacities to 162 c.f.m.
Get complete catalog.

When inquiring check 3729 opposite last page

only  Chemical Pumps
give you this

TRIPLE PROTECTION

...against corrosion

All liquid-handling parts are made of IRCAMET—highly resistant to both acids and alkalis.

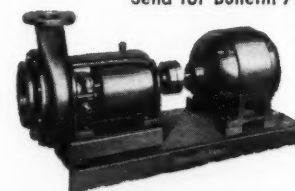
...against leakage

A patented LEAKCOLLECTOR stuffing-box gland drains off any seepage around the shaft.

...against down-time

All I-R Chemical Pumps are designed and built for easy maintenance and less of it.

Send for Bulletin 7095-A



Ingersoll-Rand

11 Broadway, New York 4, N.Y.

When inquiring check 3730 opposite last page

CHEMICAL PROCESSING

Bulletins cover lubricators and distribution systems

Bulletin of 24 pages describes cyclic and "one-shot" automatic and semi-automatic centralized lubrication systems for small machines. Selection of proper lubricator for specific machine is discussed. Distribution systems for all types of manufacturer's automatic lubricators are covered in separate 12-page bulletin. Twenty-five drawings and photographs illustrate components, schematic layouts, and actual installation of systems.

Bul 4C (Lubricators) and Bul 4A (Distribution Systems) are issued by Bijur Lubrication Corp., Dept. CP, 151 W. Passaic St., Rochelle Park, N.J. Specify 3731 opposite last page.

High-polymer fluorocarbon coatings discussed in reprint

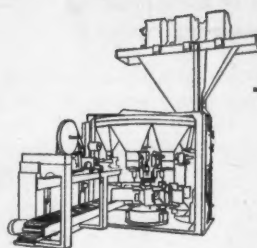
Proper choice of high-polymer fluorocarbon coatings for corrosion, extreme temperatures, electrical insulation, abrasion, and other uses is discussed in 16-page reprint of technical report. Report aids in selection of fluorocarbon to overcome a particular problem, in preparation of surfaces, and in application and "curing" of coatings. Coating processes are given for Teflon, Kel-F, and Polyfluoron.

To obtain "How to Apply and Sinter Fluorocarbon Coatings" remit 50¢ direct to Gene Bartczak Associates, 119 Soifer Ave., N. Bellmore, Long Island, N.Y.

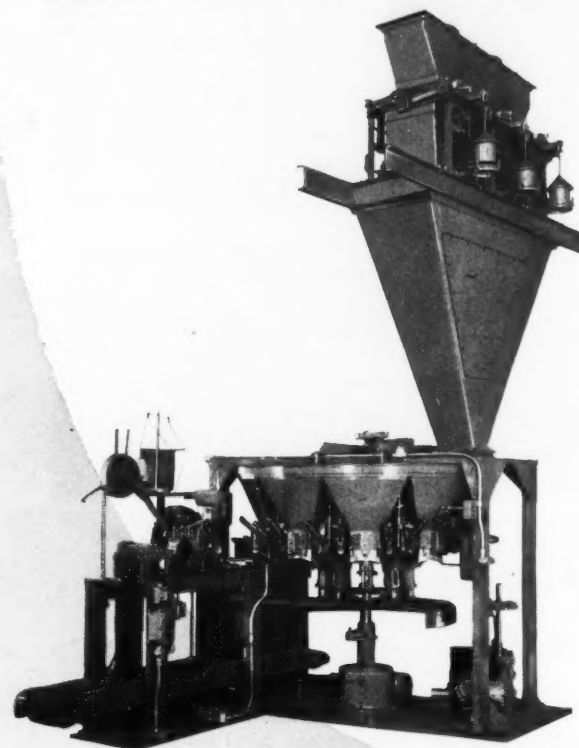
Authoritative reference on all aspects of United States-German trade

Information on industrial and consumer goods available from Germany — who manufactures them and who sells them — constitutes some of valuable information presented in 370-page hard-bound book. Listings include 2400 export manufacturers, 1500 importers, and over 10,000 products. Book features over 100 pages of data on German business and industry, investment regulations, operating costs, wages, consumer income and expenditures, advertising media and rates, and foreign trade and exchange regulations. Special 24-page statistical section contains up-to-date figures on number of plants, production, sales, and employment, as well as imports and exports, of 260 important German manufacturing lines.

To obtain "Buyers' Guide to Imported German Products" remit \$3.40 direct to Nordeman Publishing Co., Inc., Dept. CP, 14 East 62nd St., New York 21, N.Y. When inquiring specify 3732 on form opposite last page.



THE BEST FOR TWENTY-FIVE YEARS



Now with improved design...

"THE BAGPAKER"*

IP's NEW, model "AF"

"The BAGPAKER"* Model "A" for 25 years has proved there is no better method than the rotary turret for maintaining a high packing rate. Not one Model "A" Bag Packing Machine installed by us has ever been replaced by another design.

Now this proven machine has been modified and simplified, incorporating all the improvements indicated desirable in 25 years of unrivalled successful operation.

"THE BAGPAKER"* NEW MODEL "AF" FEATURES: ● *New Simple Design, for free-flowing or semi-free-flowing feeds, fertilizers, etc.* ● *Simplified Operation and Maintenance* ● *Automatic sewing reduces bag size—cuts cost* ● *Packs from 20 to 25 multiwall bags per minute with one operator* ● **LOWER COST.**

*TRADEMARK



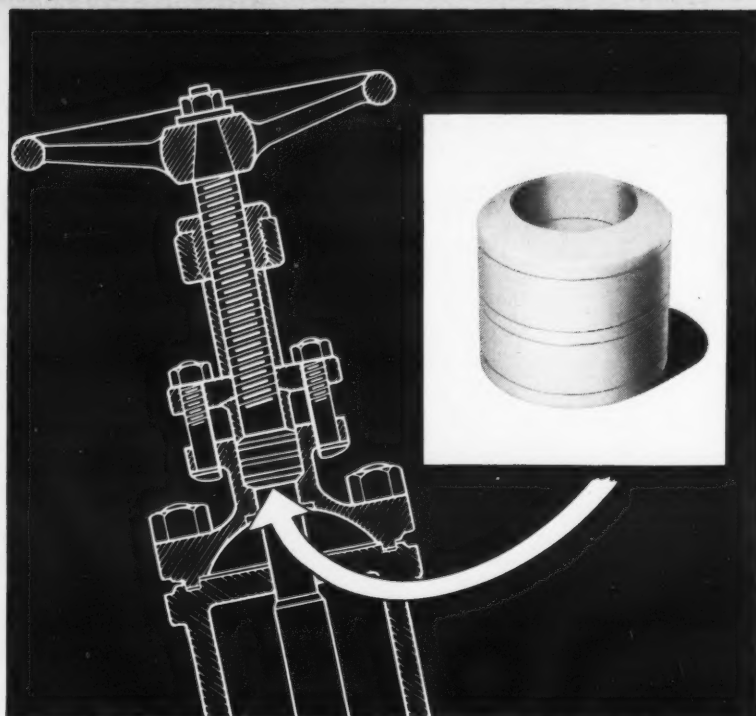
For detailed information, call or write CP-5—no obligation

International Paper COMPANY
BAGPAK DIVISION

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BRANCH OFFICES: Atlanta • Baltimore • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Kansas City, Kansas • Los Angeles • Minneapolis • New Orleans • Philadelphia • St. Louis • San Francisco • IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

When inquiring check 3733 opposite last page



R/M Teflon PACKINGS

solve your difficult sealing problems

If corrosive liquids or extreme temperatures are causing you packing failures and contamination problems, you want R/M "Teflon" packings.

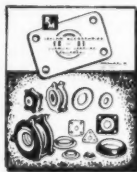
Chemically inert, R/M "Teflon" cannot be attacked by any known industrial acid, caustic or solvent. It withstands temperatures from -450° to 500°F.

R/M offers you the advantages of this unique resin in a complete line of solid, braided and plastic "Teflon" packings for all types of chemical and solvent service. R/M "Teflon" packings far outlast conventional materials,

cutting your maintenance costs and reducing downtime. They will not contaminate any piped liquid.

Also available are R/M "Teflon" couplings; and "Teflon" bellows-type expansion joints with integrally gasketed flanges and special limit bolts.

Send for a booklet on R/M "Teflon" packings telling about pure "Teflon" types, "Teflon"-impregnated asbestos, and other combinations. Includes data on R/M "Teflon" ring and envelope gaskets.



R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex, Vee-Square, Universal Plastic, and "versi-pak"; GASKET MATERIALS, "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR. *A Du Pont trade-mark

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PACKINGS

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PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

FACTORIES: Passaic, N.J.; Bridgeport, Conn.; Manheim, Pa.; Neenah, Wis.; No. Charleston, S.C.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics • Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Industrial Adhesives • Bowling Balls • Laundry Pads and Covers

When inquiring check 3734 opposite last page

NEW LITERATURE

Tells of case molding from epoxy resins

System for making case molds from epoxy resins is described in four-page bulletin. Mixing data, as well as concise summation of steps involved in molding system, are included.

Tech Bul 17 is issued by Smooth-On Mfg. Co., Dept. CP, 572 Communipaw Ave., Jersey City 4, N.J. When inquiring specify 3735 on the convenient Reader Service slip which is located opposite last page.

Standard covers driers for refrigerants

Standard for testing and rating solid-type desiccants for use in liquid line of refrigeration and air-conditioning systems has been issued. Standard establishes comparison points with respect to water capacity and refrigerant flow to provide means of drier evaluation.

To obtain ARI 710-56 remit 50c direct to Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N.W., Washington 6, D.C.

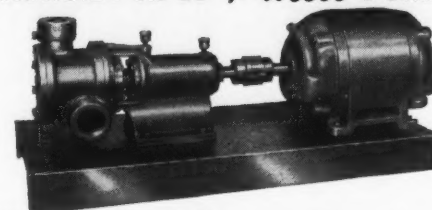
Temperature control systems — how to use them

Use of manufacturer's automatic, electric, temperature-control systems is described in 16-page booklet. Written in clear, non-technical language, booklet explains and illustrates correct application of electric controls, use of control centers to simplify installation and operation, and air distribution products to obtain best possible results from heating and air conditioning systems.

"Better Control . . . Electrically" is issued by Barber-Colman Co., Dept. CP, Rockford, Ill. When inquiring specify 3736 on the convenient Reader Service slip opposite last page.

handle those difficult jobs with

AURORA APCO Process PUMPS



NEW APPLICATIONS—the handling of liquefied petroleum gases, refrigerants and other light non-viscous liquids are easy for APCO Z4 Pumps.

SPECIAL METALS—APCO Z4 Pumps are obtainable in any machineable alloy. The small amount required of such metal represents a real economy.

PERFORMANCE FEATURES—of the APCO Pump are ideal for the type of process duties for which the APCO Z4 Pumps were designed.

Write for BULLETIN 111-ZA

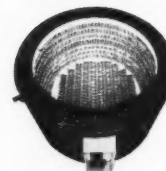
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THE NEW YORK AIR BRAKE COMPANY
62 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

When inquiring check 3737 opposite last page

TRENT "Folded-and-Formed" HEATING UNIT

... for High Temperature Application where "Sheath-Type" Heaters Fail!



The only packaged "non-sheath" type electrical heating element competing directly with fuel fired equipment for temperatures up to 2000° F. Trent "Folded-and-Formed" Heaters now offer advantages not possible with any other type electrical heating unit!

ADVANTAGES—Compact, Space Saving Design • Longer Element Life • Maximum Radiating Surface Area • High Watt Density • High Temperature Uniformity to 2000°F. • Low Thermal Inertia • High Dielectric Strength (600V) • Pin Point Control • All-welded Connections • Unity Power Factor • Direct Fired Element • Eliminates Heat Exchangers, Pipe Networks, etc. • Uniformity Equivalent to Liquid or Vapor Jackets • Economical Installation and Maintenance

APPLICATIONS—Kettles • Air and Duct Heating • Furnaces • Ovens • Reactors • Jackets and Autoclaves • Pipe Lines

Before you design or install high temperature heated equipment, discuss your requirements with a Trent heating engineer. He'll show you how the outstanding features of Trent "Folded-and-Formed" Heating Units can mean greater efficiency and higher production for your application. Write for complete literature on Trent Kettles, Jackets, Ovens, Furnaces and Heating Elements.

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TRENT INC.
Electrically Heated Industrial Equipment
242 LEVERINGTON AVE. PHILA. 27, PA.
In Canada: Toronto, Montreal, Vancouver, London, England

When inquiring check 3738 opposite last page

CHEMICAL PROCESSING

**Cleaner eliminates use of screens
ahead of paper machine**

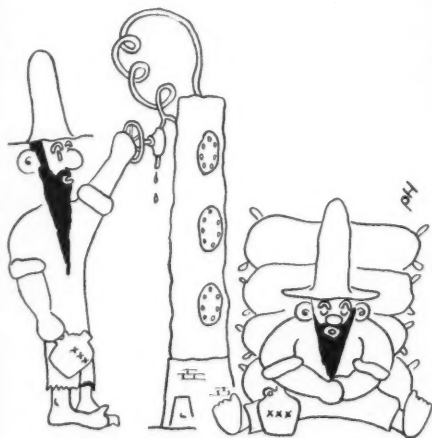
Operation and construction of centrifugal-type paper stock cleaner is explained in eight-page foldout bulletin. Unit is capable of removing dirt of wood origin and shives as well as heavy inorganic dirt. Use of cleaner frequently eliminates need for screens before paper machine's head box. Flow charts, along with explanations, of four typical paper cleaning systems are presented.

Bul P-18 is issued by the Bauer Bros. Company, Dept. CP, 1728 Sheridan Ave., Springfield, Ohio. When inquiring specify 3739 on form opposite last page.

**Tells how to dress up packages
with overwraps of foil**

Fold-out, four-page folder gives general information on foil lamination as carton covering. Two types are described and typical applications are pointed out.

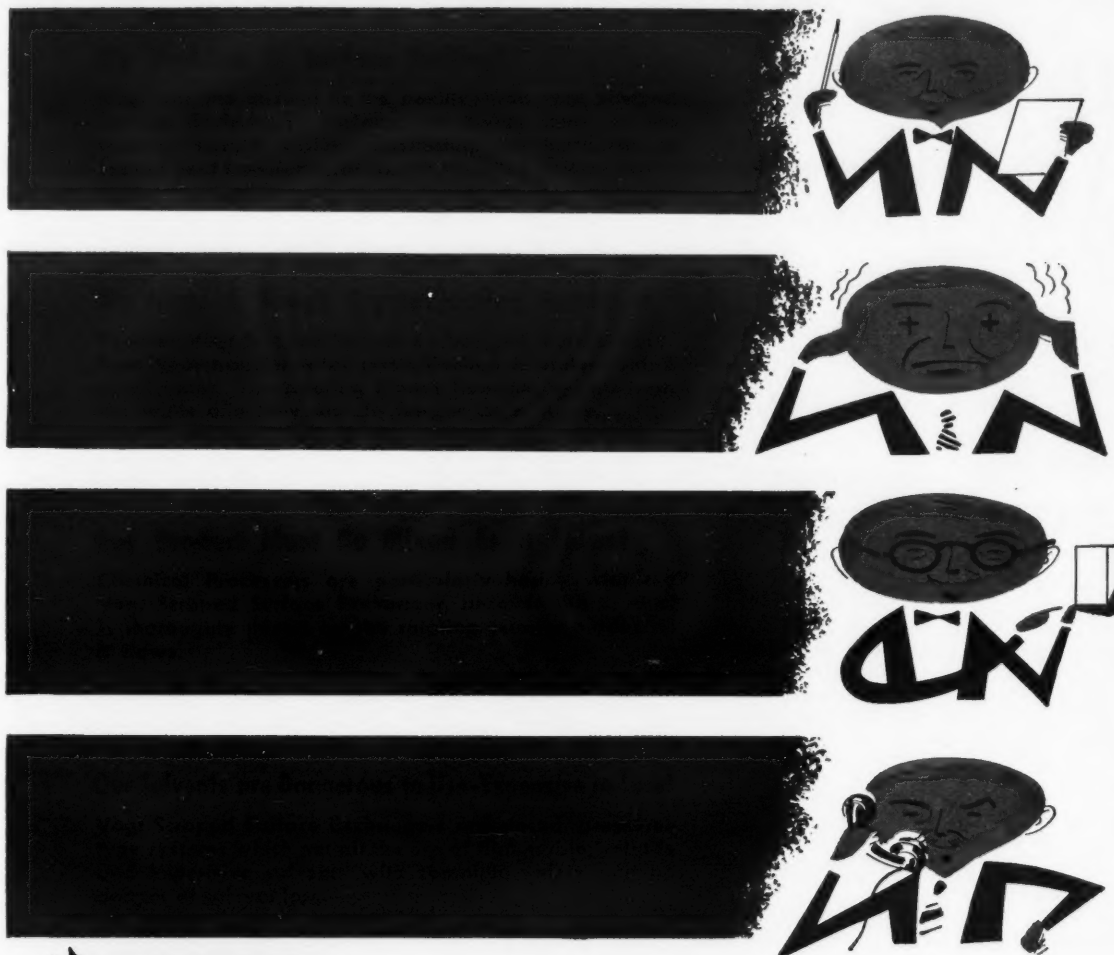
"Bencoseal" folder is issued by Continental Can Co., Inc., Dept. CP, 100 E. 42nd St., New York 17, N.Y. When inquiring specify 3740 on form opposite last page.



"Market analysis air a-lookin' up, Zeke. Reckon we oughta increase the multi-draw rate an' cut the reflux a leetle?"

Cartoon by Paul Hogroian, E. I. du Pont de Nemours & Co., Inc., Louisville, Ky.

Have You a Special Heat Transfer or Chiller Problem?



Has the answer in its Scraped Surface Exchangers

Send for Bulletin PE-1 today.
Address Dept. 24A-RICP

OTHER VOGT PRODUCTS: Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making and Refrigerating Equipment.



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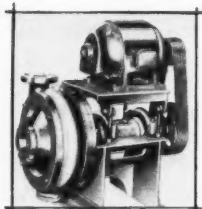
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia,
St. Louis, Charleston, W. Va., Cincinnati,

When inquiring check 3741 opposite last page

STANDS UP UNDER THE ACID TEST!

GALIGHER ACID PROOF SUMP PUMP

Acid or Caustic solutions and slurries containing up to 60% solids and froth or foam are constantly handled on a daily basis by the Galigher Sump Pump, designed for heavy duty corrosive service in the chemical industry. The Galigher Sump Pump is available in natural or synthetic rubber, plastic covering, hard iron or stainless steel. 10 to 500 gpm. capacity, 5 to 100 ft. head in various sizes, direct and V-drives. Noteworthy features include no mechanical seals, no packing, no submerged bearings, double suction thrustless design which lightens bearing load. The Galigher Sump Pump will not air lock. All this means greater performance, dependability and long, trouble free life.



The VACSEAL PUMP

Precision engineered for rugged use. Exclusive impeller design eliminates gland water.

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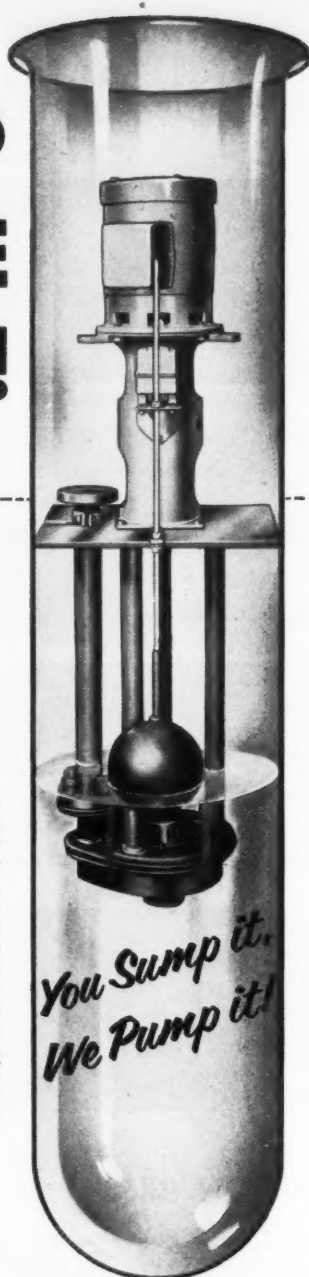
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SP-502

When inquiring check 3742 opposite last page



BULLETINS ON REQUEST . . .
Distributors in Industrial
centers of U.S. and Foreign
Countries.

NEW LITERATURE

Describes metering pump for corrosive fluids

Operation and construction of metering pump for corrosive and abrasive fluids are described in eight-page bulletin. Table lists capacities and pressures for motor-driven pumps. List of typical chemical uses is included.

Metering pump bul is issued by The Madden Corp., Dept. CP, 1345 Jarvis Ave., Chicago, Ill. Specify 3743 opposite last page.

Gives suggested uses for synthetic paraffin

Story of synthetic paraffin imported from South Africa is told in four-page brochure. Suggested uses of the product, a hard, high-melting point hydrocarbon wax, are cited. Chemical properties are given.

"Parafint" is issued by Moore & Munger, Dept. CP, 33 Rector St., New York 6, N.Y. Specify 3744 opposite last page.

Catalogs organic chemical line

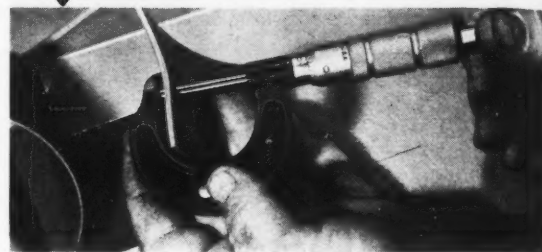
Supplementary bulletins showing product line changes and new prices have been issued by Arapahoe Chemicals, Inc., Dept. CP, 2800 Pearl St., Boulder, Colorado. Check 3745 opposite last page.

Miniature glass equipment for laboratory

Glass laboratory equipment in 14/20 joint size is shown and described in 16-page catalog. Line of components equipped with standard spherical 18/9 joints is also listed. Price list for assemblies and components is included.

"Mini-Lab" is issued by Ace Glass Inc., Dept. CP, Vineland, N.J. Specify 3746 opp. last pg.

Plastisol coatings protect "in depth"



Plastisol coated products get *seamless* protection against acids, alkalis, moisture, other corrosives.

Thickness of 60 mils or more per coat can be sprayed with Unichrome "Super 5300" Coating. Products dipped into a Unichrome Series 4000 Coating can have a protective coating up to 3/16 inch thick. Such body means *pore-free* protection, ample section to absorb damaging impact, and a long-wearing finish.

The finish has satiny gloss, resists abrasion, deadens sound, insulates electrically, doesn't age and crack. Send for Bulletin VP-2.

PLATING MATERIALS
ORGANIC COATINGS
IN A TIN CHEMICALS
CEMENT MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
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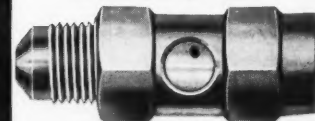
When inquiring check 3747 opposite last page

MASS PRODUCTION COSTS TOO HIGH?

Here's the ideal
low-cost indicator
for those
hard-to-get-
at places.

NEW "237" LIQUID EYE

Positive Sealing Indicator



(Illustrated 3/8" M. FL. x 3/8" FE. FL.)

The new Allin "237"
has all the proved
Liquid Eye features
plus:

- smaller — more compact — dependable. (about 1/3'd smaller in the 3/8" male to female size than any previous unit).
- complete self-contained economy unit.
- new simplified design.
- available with 2 or 3 viewing ports.

Custom units can be made to your exact specifications. Consult Allin engineers now.

Write today for full information and catalog covering complete Allin line.



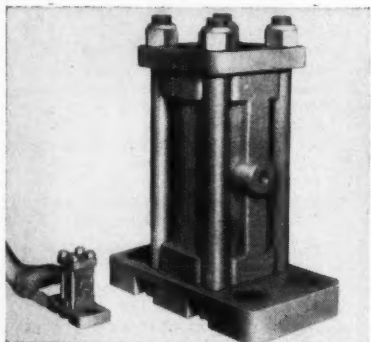
ALLIN MANUFACTURING CO.
410 N. Hermitage Ave. • Chicago 27, Illinois
Over 1,000,000 Liquid Eyes Sold to Date!

When inquiring check 3748 opposite last page

CHEMICAL PROCESSING



If so, you have a slight idea of the force exerted by one blow of a small Cleveland Bin Vibrator. Just imagine this happening 10,000 times per minute. That's what can be expected from the smallest of our air vibrators, the 1" Type F. And, if you need real brute force, there are seven larger sizes.



You can see why stuck bins get unstuck in a hurry. The beauty of it is that when properly mounted these vibrators deliver the punch of a stevedore with absolutely no damage to the bin. Write for further details.

**Air or Electric
Portable or Permanent
Silent or Standard**



2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 3749
opposite last page

MAY 1957

NEW LITERATURE

Guide to construction, design of screw conveyors

Construction and design of conveyors, with particular attention to the screw type, is detailed in 14-page report. Screw conveyors are described as the most suitable for such bulk materials as ore, coal, clinker, limestone, foundry sand, grain, and food products. Report has list of related publications.

To obtain report PB121324, remit 50c direct to Office of Technical Services, US Department of Commerce, Washington 25, D.C.

Lists selection data and prices for electrical power drives

Normal speed electric motors, geared motors, variable speed transmissions and speed reducers are covered in 20-page condensed catalog. All prices are listed, and handy tables permit easy drive selection.

Condensed Cat is issued by Sterling Electric Motors, Inc., Dept. CP, 5401 Telegraph Rd., Los Angeles 22, Calif. When inquiring specify 3750 on form opposite last page.

Depicts light-scattering instrument for measuring low light values

Light-scattering photometer designed for measurement of absolute turbidity, dissymmetry, and depolarization of dilute solutions is discussed and shown in 24-page bulletin. Instrument features extreme sensitivity for light scattering measurements of low light values down to 12 micro-micro lumens of blue light or about 0.01 micro-micro watt of radiation.

Bul BP-1000 B is issued by Phoenix Precision Instrument Co., Dept. CP, 3803-05 N. Fifth St., Philadelphia 40, Pa. When inquiring specify 3751 on form opposite last page.

Describes plastic products for electronics

Series of four bulletins plus illustrated four-page folder, bound in handy file-type cover, describe plastic products for electronics. Details are given on microwave absorbers, casting resins, plastic foams, reflector materials, and plastic rods and sheets.

"Plastics for Electronics" is issued by Emerson & Cuming, Inc., Dept. CP, 869 Washington St., Canton, Mass. Specify 3752 opp. last page.



exceptional quality for chemical processing SAFE...RUGGED...DEPENDABLE

USG Solfrunt Gauges are built to withstand combined high pressure and corrosive process conditions with the utmost safety and dependability

WHY THE USG SOLFRUNT IS THE IDEAL CHEMICAL PROCESS GAUGE:

- **SAFE**—Behind the dial is a solid metal wall. A weather-tight rubber disc in the rear releases pressure in event of a tube rupture.
- **LONG LIFE, SUSTAINED ACCURACY**—from a gauge movement having a segment of stainless steel with nylon-faced gear section. Nylon-to-metal bond stabilizes the nylon against expansion and contraction... assures proper mesh with stainless steel pinion under severe temperature and moisture conditions. (An all-stainless movement can be furnished as an alternate, where desired.)
- **EASY CALIBRATION AND ADJUSTMENT**—Arc-Loc® Movement and gauge construction permit complete recalibration by merely removing blowout disc.

Solfrunt Gauges are available in 4½", 6" and 8½" sizes, for pressures to 20,000 psi. Call your local USG Distributor today... his name is in the "Yellow Pages" of your phone book... or write for complete information on gauge styles and construction.

UNITED STATES GAUGE
Division of American Machine and Metals, Inc.
Sellersville, Pa.

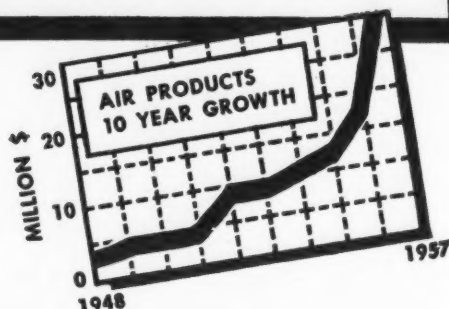
Home of the **SUPERGAUGE®**

MORE THAN 50,000 TYPES OF GAUGES • SUPERGAUGES • SOLID FRONT GAUGES • RECEIVER GAUGES • TEST GAUGES • RECORDERS • CONTROLLERS • TRANSMITTERS • PSYCHROMETERS • AVIATION INSTRUMENTS

When inquiring check 3753 opposite last page

CHEMICAL & MECHANICAL ENGINEERS

are offered opportunity to advance professionally in diversified growth company



LOW TEMPERATURE PROCESSING

The Company is the leader in the engineering, design, manufacture and construction of plants and systems for the separation of gases such as Oxygen, Nitrogen, Carbon Monoxide, Hydrogen and other low boiling building blocks of the chemical industry. We must expand the entire organization to meet the increasing demands of the steel, metallurgical and chemical industries, and for national defense.

Selected Assignments

- Process Design Engineers
- Research & Development Engineers
- Project Engineers
- Estimating & Economic Evaluation Engineers
- Mechanical Engineers
- Design Engineers
- Construction Engineers
- Field Operations Manager
- Operating Superintendent
- Manufacturing & Process Engineer
- Sales Engineers

AIR PRODUCTS, INC., situated in Eastern Pennsylvania at the foot-hills of the lovely Pocono Mountains, with ready access to three fine universities as well as other cultural and recreational facilities, offers you . . .

1. High professional salary scale.
2. Company paid advanced educational program.
3. Unusual medical and life insurance program.
4. Bonus and profit sharing opportunities.
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At AIR PRODUCTS you will work with recognized leaders in the industry.

Send resume in confidence to Mr. E. J. STROBEL

Air Products
INCORPORATED

P.O. Box 538

Allentown, Pa.

When inquiring check 3754 opposite last page

NEW LITERATURE

Covers reduction mills for wet and dry grinding

Tricone, rod, cylindrical, tube, batch, conical and disc-roll reduction mills are covered in six-page bulletin. Illustrated with drawings and photographs, literature also includes list of over 100 materials that have been ground with the equipment. Brief description of grinding mill accessories and classifying devices is included.

Bul AH-474 is issued by Hardinge Company, Inc., Dept. CP, 240 Arch St., York, Pa. When inquiring specify 3755 on form opposite last page.

Automatic pallet unloader described in bulletin

Drawings and photographs show operation of automatic pallet unloader. Four-page bulletin gives complete description of machine designed to receive pallet loads of cases and automatically unload each pallet onto conveyor line.

Bul F-225 is issued by Alvey Conveyor Manufacturing Co., Dept. CP, 9308 Olive Street Road, St. Louis 24, Mo. When inquiring specify 3756 on form opposite last page.

Tells of valve manufacturer's role in atomic power activities

How manufacturer is participating in design, development, and manufacture of relief valves for nuclear reactors is described in four-page folder. Production and testing methods are illustrated. Safety and relief valves, and indicating gages for chemical processing and other applications are briefly summarized.

"Atomic Power Activities" is issued by Crosby Valve and Gage Co., Dept. CP, Wrentham, Mass. When inquiring specify 3757 on form opposite last page.

Shows results of lubricant tests using MoS₂ additive

Bulletin of 12 pages explains function of molybdenum disulfide as lubricant additive, and describes uses. Characteristics of lubricants containing additive, as demonstrated by standard tests, are summarized.

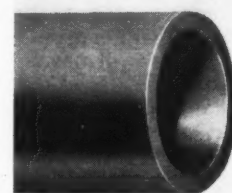
Bul Lu-6 is issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. Specify 3758 opposite last page.

kraloy
plastic pipe

KRALOY

KRALOY PLASTIC PIPE CO. INC.
LOS ANGELES CALIFORNIA

protects product



purity

Kraloy PVC Plastic Pipe used in your plant will deliver your product clean and pure. You particularly need Kraloy PVC (which cannot scale or corrode) if your product or any of its components react to metallic pipe and acquire impurities from it. Clean as glass, KRALOY PVC PIPE is proud to have been granted the approval of the National Sanitation Foundation.

Kraloy PVC High Impact Plastic Pipe and Tubing will deliver most liquid and gaseous chemicals with higher efficiency and less maintenance and policing than any other standard piping material. Superior flow characteristics (C factor=150+) eliminate problems concerned with fatty acids and other fats, oils, and syrups, and guarantee high flow rates with lower head loss. Ph factors from 2 to 13 are all the same to KRALOY PVC. Bends and other fabrications are easy. Abrasion? Send us your specifications, bearing in mind that KRALOY PVC PIPE is already used in many slurry installations. Instrument and instrument-control pipe and tubing, too.

Write for detailed brochure, and name of your factory representative nearest you.

KRALOY PLASTIC PIPE CO., INC.

4720 E. Washington Blvd., Los Angeles, Calif.

kraloy

KRALOY PLASTIC PIPE CO. INC.
LOS ANGELES CALIFORNIA

Subsidiary of the Seamless Rubber Co.
a Rexall Drug Co., Subsidiary KP-110

When inquiring check 3759 opposite last page

CHEMICAL PROCESSING

LOW-TEMPERATURE PROCESSING . . .

0°f

-460°f



Couple Your Process Piping With SIFCO STAINLESS INSERT FLANGES

they eliminate the problem of bolt hole alignment, insure maximum sealing, leakproof joints.

You'll get flexibility of installation, lower maintenance, fewer replacements when you connect process piping with SIFCO STAINLESS INSERT FLANGES.

They eliminate the problem of bolt hole alignment

They are economical. Only the insert of corrosion resistant alloy comes into contact with the corrosive element. The flange is of lower cost carbon steel.

They lower labor cost since they connect easily, line up quickly on original and replacement installations.

These are the SIFCO styles:

SLIP-ON—the most economical stainless insert flange to weld to pipe or fitting.

ROLL-ON—for use where welding, van stoning or threading is not desirable. Can be assembled by a simple expanding method.

SOCKET TYPE—provides ideal welding features to insure leak proof joints.

THREAD-ON—assures tighter threaded connection and can eliminate back welding, achieving bolt hole alignment without loosening thread.

Write, wire or call for full details and catalog or see your local distributor.

Stainless Insert Flange Co.
6526 Upland St., Phila. 42, Pa.
BEIgrade 2-8850

When inquiring check 3760 opposite last page

Science Education

(Continued from page 9)

the chief professional administrator in the local school system, usually the superintendent of schools. Sometimes in a large and a complex system the best contact might be the principal of a high school. It is well to approach someone on the administrative level in most cases, rather than a classroom teacher.

This contact can be made with the assurance that school people are interested. You need only to remember that you must recognize the status of the professional in education and handle contacts in such a way that you do not appear to criticize educators or the educational system or to compromise the authority, integrity, or professional stature of the educators. Almost invariably you will find that the people in education will meet you more than half way. They will usually be glad to know that such help is available.

The educators themselves will be full of ideas about what you can do. One of the most frequent suggestions is that you address informally a student assembly, a science class, a career-day conference, or some other meeting of students or faculty members.

When you talk to a student group you face a set of conditions that are quite different from those you normally face in addressing adults in industry, in a technical society, or in a trade association. Here are some ideas for consideration. They are not rules, and will need to be adopted or adapted on the basis of local conditions and individual circumstances. They have been distilled from the experience of a number of people, professionals and laymen alike.

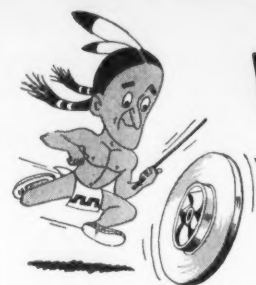
Students in a high school assembly are only in a physical sense a captive audience. You can keep their bodies captive more or less, but no process has yet been discovered for capturing their minds by force. This has to be done through the subject and nature of the talk, the manner in which it is presented, and the understanding and personality of the speaker.

Keep it short

The first requisite of a successful talk before a student group regardless of the subject is that it must be short. This is extremely important. You can hold the attention of the adolescent mind only for a limited number of minutes. After that, further talk not only does not register but it confuses and destroys any impact that already has been made. Even though the assembly period is scheduled to last for 45 minutes your message will register better and you will have more chance to convert students to your way of thinking if you hold the length of your talk down to an absolute maximum of 15 minutes, with a 10 minute period greatly to be preferred.

The first question that will come to mind is "What

(Please turn to page 237)



HOW! PUMP USERS!

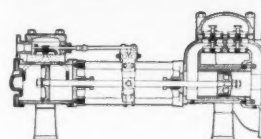
Go Modern... Go 3500 RPM

● Where Overall Specific Speed indicates, take advantage of the lower costs that go with modern, high speed centrifugal pumps. For any given condition, the higher the rotating speed, the smaller the pump, and the smaller the driver.

WARNING! High speeds require mechanical reliability. Dean Brothers standard centrifugal pumps are designed for 3500 RPM.

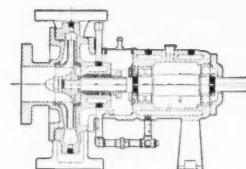
The Best is our Standard

A WIDE RANGE OF OVERALL SPECIFIC SPEEDS IS COVERED BY THESE DEAN BROTHERS PUMPS



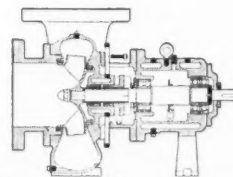
RECIPROCATING TYPE

Low Capacities and High Heads.
Indicated for Overall Specific Speeds of less than 500.



CENTRIFUGAL TYPE

Medium Capacities and Moderate Heads.
Indicated for Overall Specific Speeds from 500 to 3500.



MIXED FLOW TYPE

High Capacities and Low Heads.
Indicated for Overall Specific Speeds from 3500 to 5000.

OVERALL SPECIFIC SPEED

$$N_s = N \sqrt{Q/H^{3/2}}$$

N_s = Overall Specific Speed
 N = Pump Rotative Speed
 Q = Pump Capacity—gpm
 H = Head—ft.

● If you would like to know how Overall Specific Speed can help you select the proper pump, write us or call your local Dean Brothers representative.

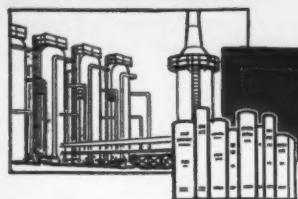


DEAN BROTHERS PUMPS INC.

EST. 1869

323 West 10th St., Indianapolis 7, Ind.

When inquiring check 3761 opposite last page



processing and engineering data

196

Thermal Conductance of Tubing

J. BRONSON BAYLISS
Asheville, N. C.

In designing heat exchangers, many engineers consider thermal resistance of the tubing to be negligible in comparison with film resistances. Actually, for heavy-wall tubing and low-conductivity metals such as stainless steel, the resistance of the tube-wall is often important.

This nomograph helps one to decide about such resistances and to determine the conductance for use in calculating the overall heat transfer coefficient. Conductance is product of thickness of the tube-wall and thermal conductivity¹ of the metal

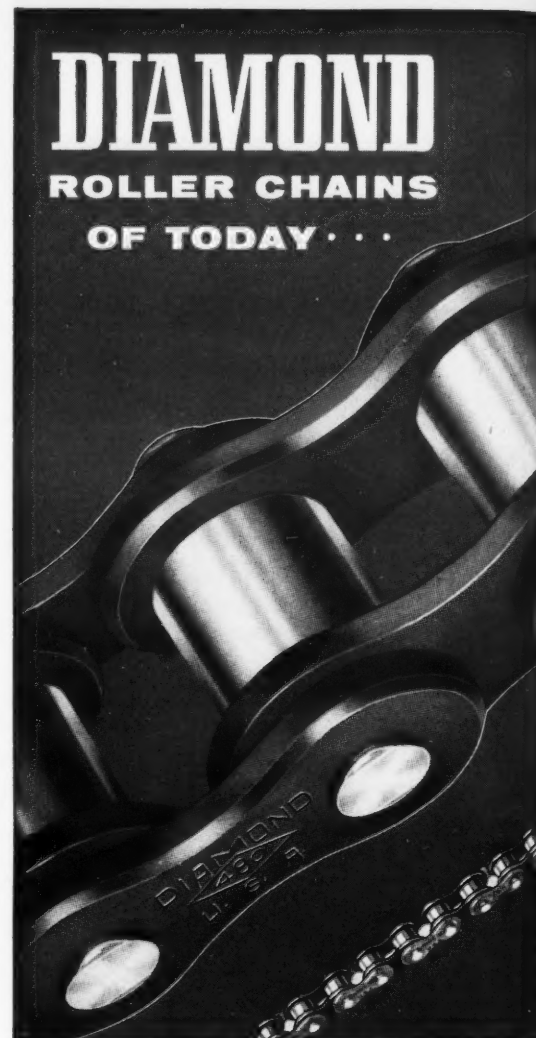
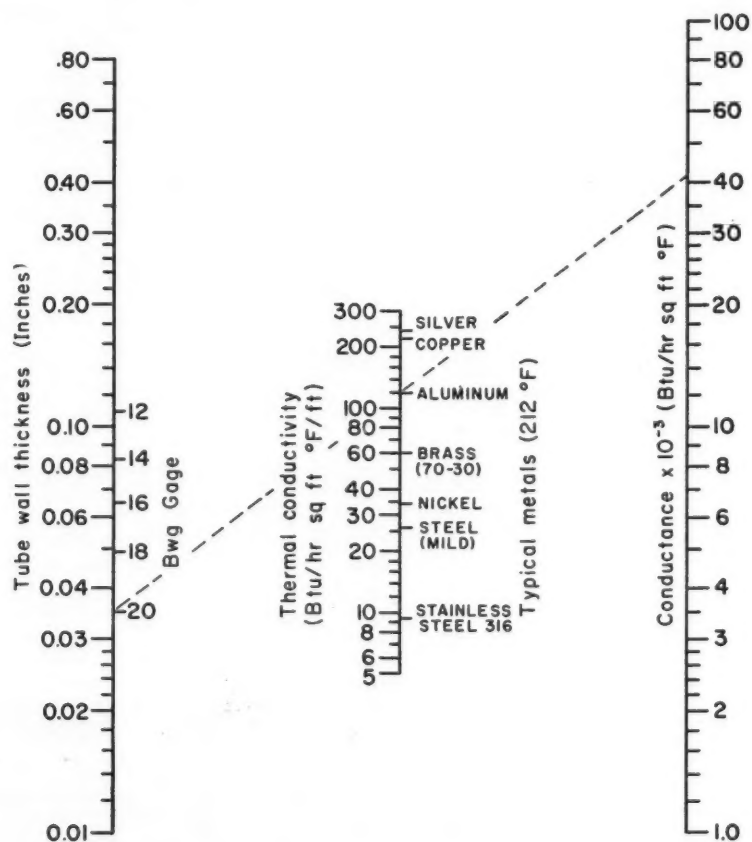
at the applicable temperature, which in this case is 212°F.

Typical Example

Index line shows that conductance of No. 20 BWG aluminum tubing with wall thickness of 0.035" and thermal conductivity of 119 Btu (hr) (sq ft) (°F/ft) is 41,000 Btu/(hr)(sq ft) (°F).

LITERATURE CITED

1) PERRY, J. H., "Chemical Engineers' Handbook," p 456, McGraw-Hill Book Co., Inc., New York (1950)



MEET STILL HIGHER STANDARDS OF UNIFORM QUALITY

New procedures and methods are always in process at Diamond—research, specialized engineering, experiment and testing, newer heat-treating methods, preloading, shot-peening, better raw materials. You get all this and over 65 years of manufacture with skilled craftsmen and most modern equipment, only at Diamond.

There is practically no end to the applications of Diamond Roller Chains. Our engineering staff is ready at all times to make practical recommendations.

DIAMOND CHAIN COMPANY, Inc.

Dept. 411, 402 Kentucky Ave., Indianapolis 7, Indiana

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When inquiring check 3762 opposite last page

CHEMICAL PROCESSING

Science Education

(Continued from page 235)

in the world can I say that is at all important in such a short time?" You'll probably be surprised to find that, if the subject is sufficiently well thought out, *you can register one really significant idea*. If this idea is good enough, the results can be well worth the effort.

And they're not "boys and girls"

Students in high school think of themselves as rather mature, intelligent, and sophisticated people. It is fatal to address them as "boys and girls." Successful teachers and speakers who make the biggest hit with high school students address them as "ladies and gentlemen," as "men and women" or as "young men and young women". They like to think that they are adults and they appreciate any indication that you think they are reasonably well grown up. Don't talk down to them, or do or say anything that they can possibly interpret as condescending or patronizing.

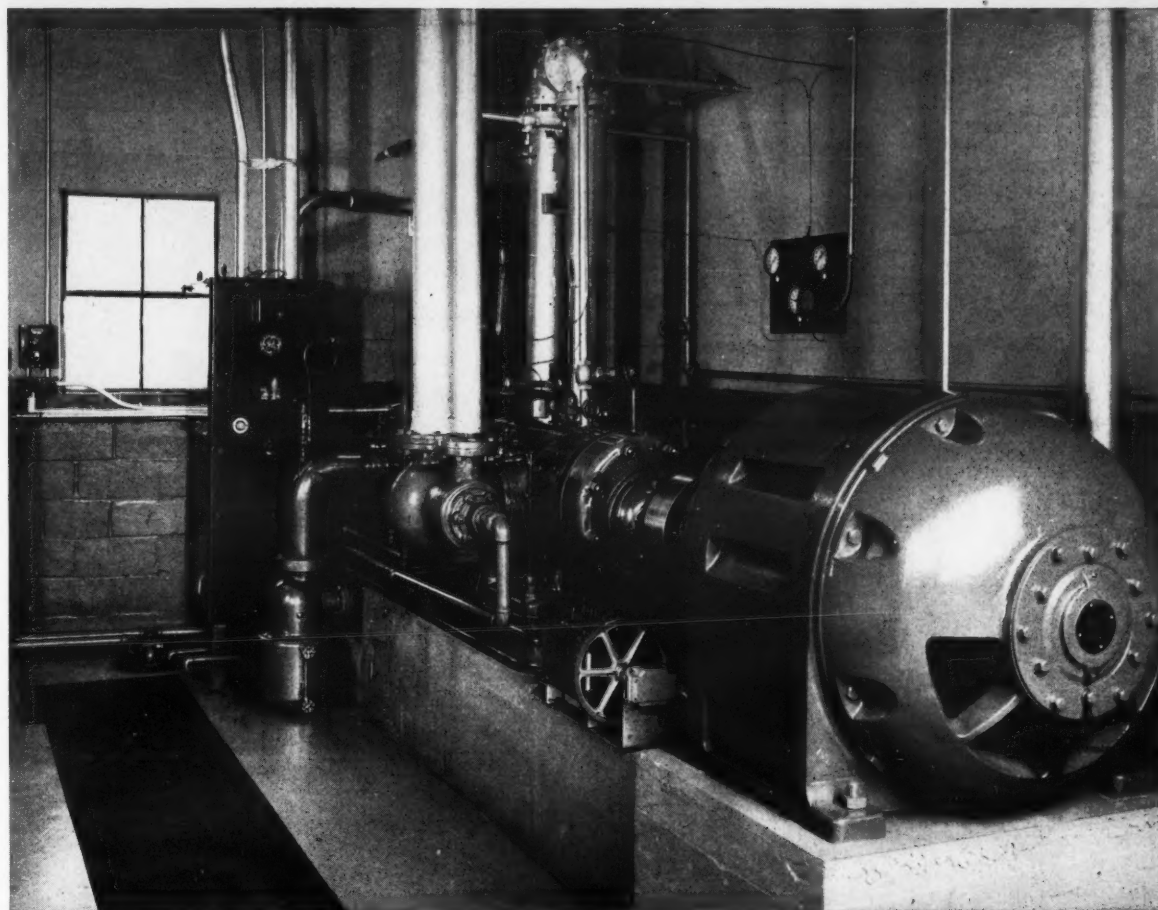
Another fatal error is to try to be cute or coy or funny. A humorous story has no place in a talk before a high school group. The best success is achieved by coming straight to the point, talking about it forthrightly in simple words and simple sentences and in leaving the audience with a well-thought-out terminal idea.

Do not go back into a long complicated history of the topic or feel that it is necessary to develop a historical background and an introduction to your subject. Students are interested in what is happening today and are looking forward to what is going to happen tomorrow and the next day. Whatever you do, do not reminisce about your own school days, the teachers you had, the differences between your schools and the fine buildings and equipment that students have today, or your own athletic or intellectual prowess.

Be sure to be well prepared. It is a good idea to write out carefully what you are going to say, work it over until you have developed your subject in the most economical manner possible with every single thought pertinent to the basic subject. Then make a few brief notes from your manuscript, fold the manuscript up and put it in your pocket. If you can talk without notes, so much the better, but you can usually get away with a few brief notes on a card held in your hand. *Whatever you do don't read your talk or recite it word for word from memory.*

The high school audience is very critical. They like sincerity and respect it. They are quick to catch insincerity, sham, and pretense. They haven't much patience with egotism or boastfulness, personal or corporate. It is highly desirable to be enthusiastic about your subject, and to say nothing in which you

(Please turn to page 239)



Fuller Rotary Two-Stage Compressor, C135-135H. Capacity 680 c.f.m., 100-lb. pressure, 690 r.p.m., 150 hp. motor.

16,000 HOURS OF OPERATION WITH NO MAINTENANCE

Empire Steel Castings, Inc., Reading, Pennsylvania, installed a C-135-135H Fuller Rotary Two-stage Compressor in April 1953. After 32 months—approximately 16,000 hours of operation—the compressor received a routine inspection, when a new set of blades was installed in the higher-pressure cylinder.

The Empire engineers report no downtime since replacement, although they've added 4,000 operating hours. Prior to switching to Fuller, their former experience with compressors was a different story—

as many as several overhauls in one year. With Fuller equipment furnishing a constant high capacity air supply, production costs have been greatly reduced.

Here's how Empire uses compressed air:

- In the molding department, supplying all air for pneumatic rammers, all squeeze and jolt machines, automatic set-out and lifting apparatus of mold conveyors, automatic shake-out machines, mold cleaning and spraying equipment.

- In the core department, for ramming

equipment, spraying and torch drying equipment, core oven operation as well as core blowing equipment.

- In the cleaning department, pneumatic chipping hammers and grinders, blacksmith requirements, sand-blasting, pressure testing and miscellaneous tools.

- In the heat-treating department, heat treating furnace operation and cooling equipment.

To get all the facts and engineering data, write today for Bulletin C-5A.

C-298
3662



FULLER COMPANY

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930



When inquiring check 3763 opposite last page



Vapor Pressures of Perfluoropentanes

D. S. DAVIS

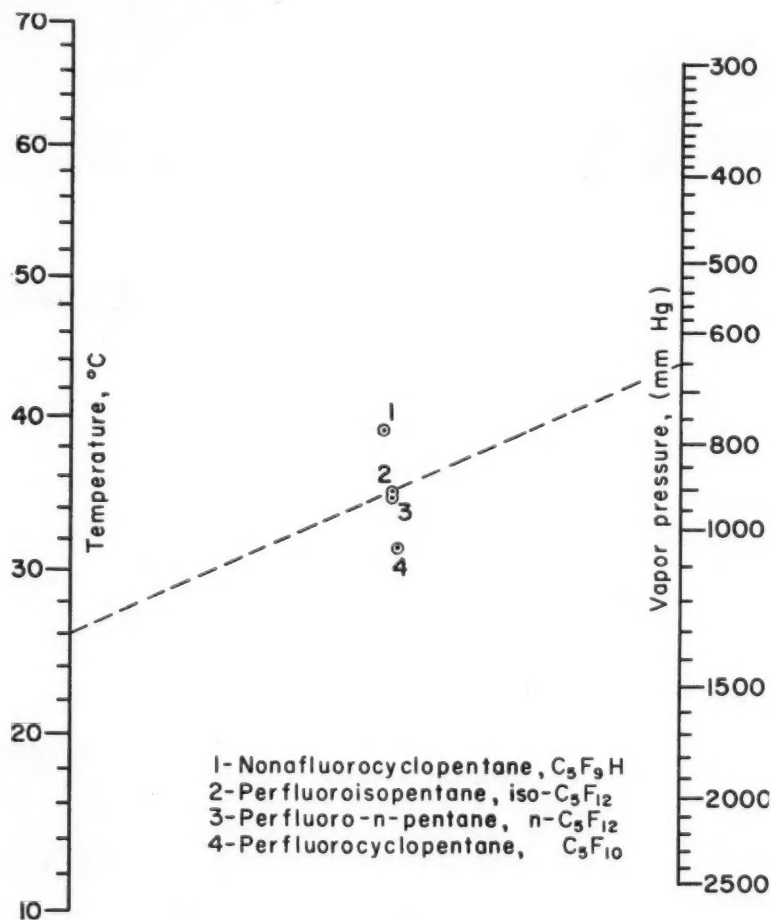
Professor of Engineering
University of Alabama

For the data of Barber and Cady¹, the vapor pressures p , in millimeters of mercury, and the temperatures t , in degrees centigrade, of perfluoropentanes are related by means of the equation:

$$\log p = a + \frac{b}{t+230}$$

where a and b are specific to the compound.

The accompanying line coordinate chart, constructed through application of well-known methods² solves this equation.



Typical Example

The broken line shows that the vapor pressure of perfluoroisopentane (gage point 2) is 650 mm of mercury at 26°C.

LITERATURE CITED

- 1) BARBER, E. J., AND CADY, G. H., *J. Phys. Chem.*, Vol 60, No 504 (1956)
- 2) DAVIS, D. S., "Nomography and Empirical Equations," Chap 10, Reinhold Publishing Corp., New York (1955)



Plastic Coating Stops Costly Condensation Drip and Rust

THE COSTLY PROBLEM caused by dripping from this sweating pipe was permanently solved with one easy and inexpensive application of NoDrip Plastic Coating. Sweating pipes, ceilings, air ducts and other metal equipment are also completely protected against rust and corrosion by low cost NoDrip.

NoDrip Plastic Coating acts immediately to insulate and protect. One application adds many years of service life to metal equipment. NoDrip is also resistant to acid, alkali and brine...protects concrete, brick, plaster, tile wood or composition surfaces.

Easy application requires no special equipment or skill. Anyone can apply NoDrip with brush, trowel or spray. Stop your condensation problem now! Get full details without delay.

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Company _____ Title _____
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When inquiring check 3764 opposite last page

CHEMICAL PROCESSING

Science Education

(Continued from page 237)

do not thoroughly and sincerely believe. Students like to feel that you are taking them back stage and giving them some inside information on your field or on your subject.

Watch your mannerisms. Be easy and relaxed. Don't refer to teachers or administrators by their first names. Don't play with the microphone.

It is important that your personal appearance and manner support your talk. Students like a straightforward, forceful presentation. Certainly if a person is talking about the advantages of a career in science or industry he should appear to be successful, confident, and happy. One teacher with whom I discussed this matter said that the ideal assembly speaker should look like a professional basketball player, wear a Phi Beta Kappa key, and speak in the simple English of a Kipling poem.

You will help your cause greatly if you are able to bring along some booklets or pamphlets or even some mimeographed notes that are directly pertinent to the subject of your talk. These should not be advertising material for a product or a company, and should be approved by the administrator before you distribute them. They should be distributed after you are through speaking, never before.

When you have finished, do not ask for questions from the floor. This never works out with a student audience, and sometimes the answers succeed in tearing down all the good that the speaker has done. If you finish before the end of the period those who are particularly interested will come down to the front of the room to see you and ask questions. If you have completed your presentation well before the end of the period — and if you have made a hit with the students — you may be surprised to find that the entire remaining time will be employed this way.

If you use illustrative material, beware of charts and slides that require turning out the lights. This is a fine way to lose the audience mentally, if not physically. Charts or pictures or three-dimensional exhibits are fine if they are large enough, if the lettering on charts, for instance, can be read from the back of the room and if the message is pertinent and clear. Charts and illustrations are especially good if they can be left standing around the auditorium at the end of your talk for the students to examine a little more carefully.

It is always good, in preparation for a talk of this kind, to sit down with some of the educators and frankly ask their advice. These people can give you a great deal of help. They are doing this kind of thing every day and quickly learn those things that work best, as well as the things that are not successful.

It is a rewarding experience to talk before a stu-

(Please turn to page 241)

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Values

**R-P&C
VALVES**

DESIGNED FOR DEPENDABILITY



BAR STOCK VALVES FOR CLOSE CONTROL, ESPECIALLY SUITED FOR CLOSE-COUPLED INSTALLATIONS

• rated for pressures up to 10,000 PSI •

• The bar stock valve, designed originally by R-P&C engineers, is really a versatile performer. First developed for instrument use, bar stock valves have proven to be the answer to valve problems of many different kinds. Designed for close control, they are ideal for throttling service. Their compactness makes them the natural choice for crowded locations such as panel boards. Economically priced, they serve in many applications as general purpose valves. And they are built in a wide variety of materials—can withstand extremely high temperatures and pressures.

For example, the Fig. 1040-A Valve shown here, made from carbon steel, is rated for 10,000 psi at 150°F. Each of these valves is individually tested at

15,000 psi before it leaves the factory.

R-P&C's complete line of bar stock valves includes constructions in 12-14 chromium stainless steel, 18-8 molybdenum stainless steel and bronze. Sizes range from 1/8" to 1" in globe and angle styles with female ends, male and female ends, or male union ends. For extremely severe throttling services, R-P&C bar stocks can be supplied with stellite discs for extra abrasion resistance.

Your R-P&C distributor carries not only a complete line of bar stock valves but also a wide selection of gate, globe, angle and check valves in bronze, iron, and cast and forged steel. You will find the answer to your valve problem in his selection.



FREE WALL CHART "How to Protect Your Valves"

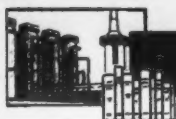
Installation pointers, operating tips, clues to longer valve life. They are all on this 22" x 17" wall chart. Write for your free copy.

R-P&C VALVE DIVISION AMERICAN CHAIN & CABLE

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When inquiring check 3765 opposite last page



Relative Centrifugal Force for a Laboratory Centrifuge

RONALD H. LESTER
Baltimore 15, Md.

In particle size analysis or fractionation, centrifuges with rotating radii r of 8.0 to 17.0 centimeters and speeds N of 400 to 3000 rpm are often used in the laboratory. This nomograph was constructed by means of standard methods¹ to determine RCF, relative centrifugal force in gravities, from the equation:

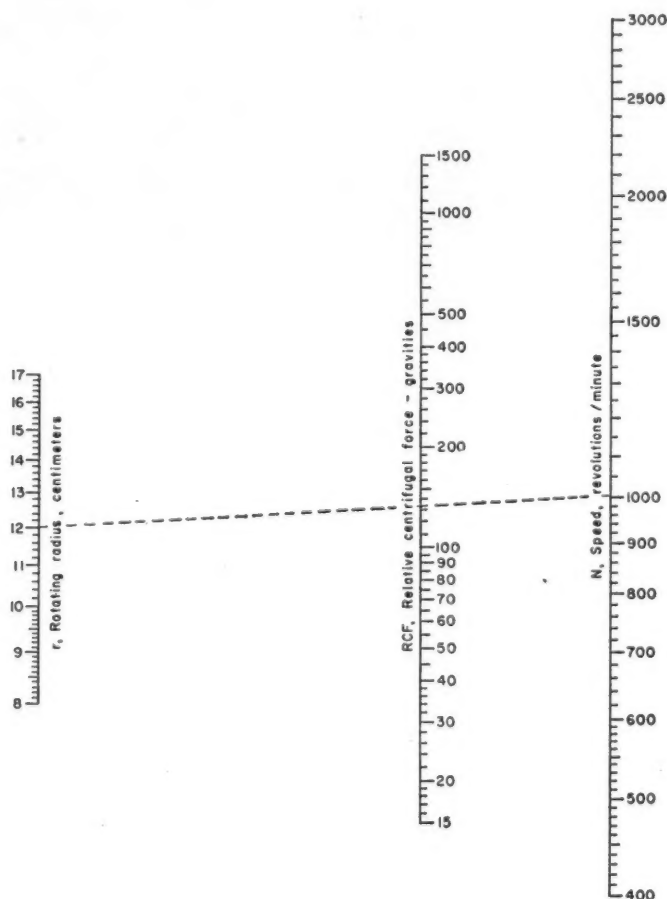
$$RCF = 1.118 \times 10^{-5} r N^2$$

Typical Example

For a speed of 1000 rpm and a radius of 12 centimeters, the relative centrifugal force is 134 gravities.

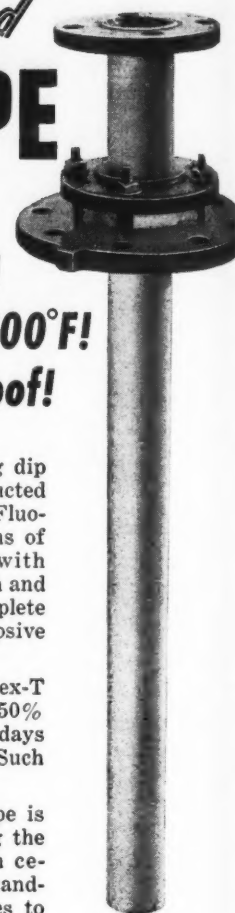
LITERATURE CITED

1) DAVIS, D. S., "Nomography and Empirical Equations," Chap 6, Reinhold Publishing Corp., New York (1943)



TEFLON[®]

Laminated DIP PIPE



- ☆ Won't break!
- ☆ Withstands 500°F!
- ☆ Corrosion-proof!

Here are non-contaminating dip pipes and spargers constructed for freedom from trouble. Fluoroflex-T pipe has laminations of glass fibre impregnated with Teflon. The one adds strength and rigidity and the other complete inertness to hot, highly corrosive chemicals.

In one test case, Fluoroflex-T dip pipe was immersed in 50% hydrofluoric acid for 150 days without any visible effect. Such performance is typical.

Best of all, this inert pipe is fracture-proof...eliminating the problem encountered with ceramics or glass. Available standard in 2" I.D.; special sizes to 6". Send for Bulletin FTL-2.



Stress-relieved TEFLON STOCK

Fluoroflex-T rods, sheets and tubes are stress-relieved to provide dimensional stability in parts machined from them. Available from stock in a wide range of sizes. Contact us on your needs for the Teflon recognized as tops in quality.

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SOUTHWESTERN PLANT: DALLAS, TEX.

When inquiring check 3766 opposite last page

CHEMICAL PROCESSING

Science Education

(Continued from page 239)

dent audience. The students will see in you a typical representative of industry and science. If you do the right kind of a job they will not only get your message and remember it, but will also realize that to be a scientist does not necessarily mean that a person has to be a genius, a social misfit, or some kind of a queer individual. They will realize that executives in industry are ordinary people who can talk in a straight-forward, understandable manner about things that are of interest to students. There are many advantages to science and industry and to education in creating these impressions upon the young men and young women who are to be the scientists and the executives of the future. ■

Patents

(Continued from page 11)

this industry are conspicuous for their large research outlays. The result of such research — conducted in competition with that of other companies — is a variety of new drugs, new fibers, new plastics, and new petroleum refining processes from which the customer can select. The Cellophane Case, itself, involved one aspect of this competition.

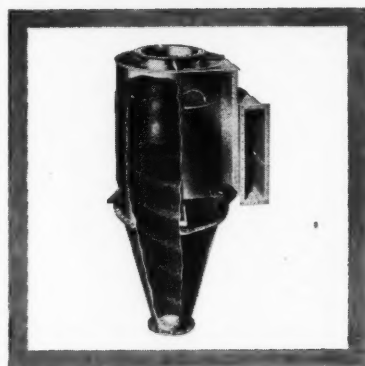
Petroleum refining shows how competition takes place in patent licensing. At least six different catalytic cracking processes, twelve patented catalytic reforming processes, and five patented alkylation processes are available to the industry — all developed as the consequence of research competition among the various major refiners and independent research organizations.

This does not mean that individual effort is unimportant, or that the patent system is out of place with respect to such effort. We can point to modern examples of individual activity stimulated by the patent system. Thiokol Chemical Corp. — manufacturer of the first synthetic rubber in the United States — developed from the inventions of Dr. Joseph C. Patrick. Thiokol has stated that patent rights made it possible for the company, "despite its small size, to build on this new development and expand to its present stage."

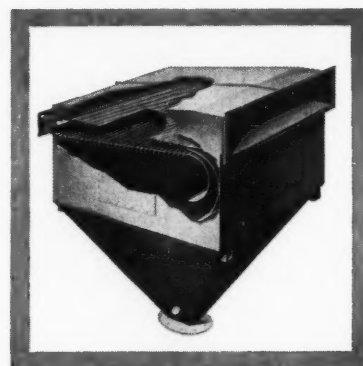
The activities of Samuel Ruben, a skilled chemist working on his own, have been made financially successful by his patent licenses to Mallory Co., covering inventions in the magnesium/copper sulfide rectifier, the dry electrolytic capacitor, and the mercury battery. Mallory states that "with the protection of his (Ruben's) patents, Mallory Co. has been justified in spending millions of dollars in commercial development of his inventions."

(Please turn to page 243)

How Buell's Exclusive Rapping Mechanism delivers Extra Dust Collection Efficiency



Buell Cyclones offer two "extra-efficiency" advantages: (1) exclusive Shave-off which harnesses double-eddy and puts it to work, and (2), large diameter design which eliminates clogging.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for natural or forced draft installations. Ideal for boilers from 100 to 2000 BHP.



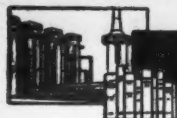
For more specific data about Buell's extra efficiency, write Dept. E-11, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

buell



Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

When inquiring check 3767 opposite last page



Caustic Soda Addition in Pulp Bleaching

By G. W. LEWIS, JR.

Assistant Quality Control Supervisor
National Gypsum Co., Mobile, Ala.

For the paper industry, the rate of addition of caustic soda in continuous flow bleaching process can be determined by use of following equation:

$$F = \frac{10 RC}{T}$$

where, R = flow rate of pulp, kilograms/minute
C = amount of NaOH required, percent
T = strength of NaOH, grams/liter
F = rate of addition of NaOH, liters/minute

This equation can be solved quickly and accurately through use of the accompanying nomograph

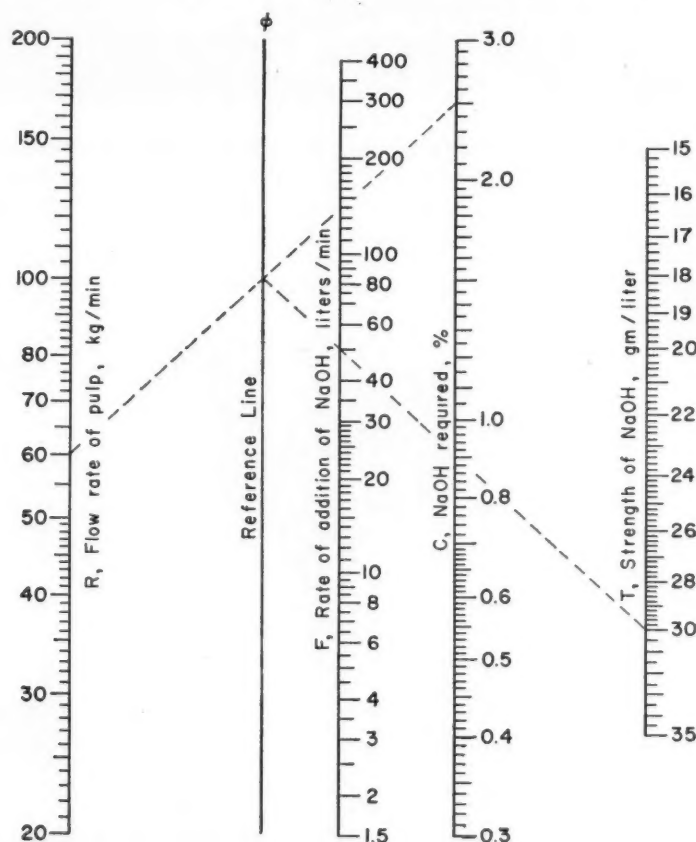
which was constructed by well-known methods¹.

Typical Example

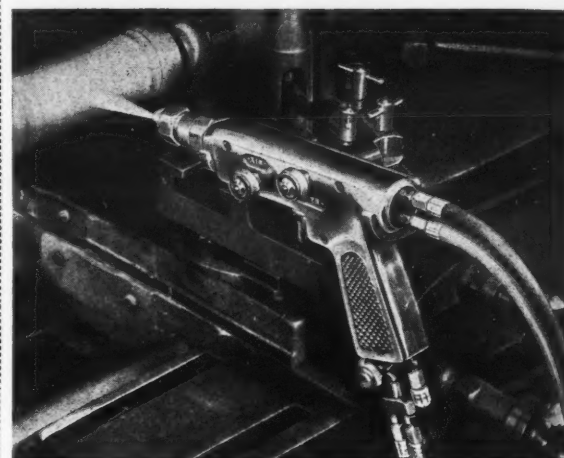
If flow rate of pulp is 60 kilograms per minute, the percentage of NaOH required is 2.5, and the strength of the NaOH is 30 grams per liter, then the rate of addition of NaOH is 50 liters per minute.

LITERATURE CITED

(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 5, McGraw-Hill Book Co., Inc., New York (1943).



STOP CORROSION

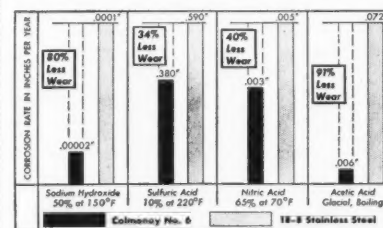


with Colmonoy Spraywelding

The superior corrosion resistance of Colmonoy No. 6 alloy makes it the ideal hard-facing material for use on surfaces undergoing metal-to-metal wear under corrosive conditions, such as pump and valve parts.

The Colmonoy Spraywelder puts No. 6 on fast, in powder form. It makes smooth overlays within .010" of desired size, requiring a minimum of finishing. Sprayweld overlays are solid and welded to the base metal.

The corrosion of vital process equipment parts becomes needless waste when the wear resistant qualities of Colmonoy No. 6 are combined with the economy and ease of the Spraywelder.



This table shows the comparative resistance to corrosion of Colmonoy No. 6 and 18-8 stainless steel. No. 6 is resistant to almost all caustics and acids. Ask for Engineering Data Sheet No. 3.

WRITE RIGHT NOW

For the Colmonoy Spraywelder Catalog and Hard-Facing Manual No. 79

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CHEMICAL PROCESSING

Patents

(Continued from page 241)

This competition in research, new products, and new processes is influenced by the patent system in three major respects: 1) the patent system provides a protected market with the opportunity for unusual profit necessary to justify heavy investments in time, effort, and capital necessary to bring an improvement to the public; 2) this same protected market provides an entering wedge by which a business enterprise entering a new field can overcome the obstacles that otherwise discourage entry into an industry already populated; and 3) the ever-present threat of new firms with exclusive rights to new technologies compels existing business enterprise to explore avenues of improvement upon pain of sudden obsolescence and possible foreclosure from a new development.

Nothing short of wholly impossible large-scale social experimentation can determine the pace to which technical progress would drift in the absence of the patent system. There are unquestionably areas where research would continue — and doubtless some business enterprise would finance some research for non-competitive reasons. And in some areas — especially the chemical industry — secrecy would form a tolerable substitute for patent protection. It seems clear, however, that the pace would fall substantially below that of the present, and that in many areas copying and not creating would be the rule.

Long-term projects, particularly, would be put to one side in favor of minor short-term changes that could be written off before competition moved in. The activities of the royalty-supported organizations, such as Universal Oil Products, and the various college and university foundations, would doubtless be restricted and in some instances brought to an end.

And in the case of manufacturing business enterprises, management would doubtless consider many current research and development expenditures unjustified in the absence of possible patent protection. Finally, we can be certain that investment capital would shy away from many new enterprises that presently obtain capital on the strength of existing or prospective patent protection and would gravitate to the established concerns which would be free to appropriate the developments of the pioneers.

The competitive atmosphere has a unique importance in research, product and process improvement. History is replete with illustrations of research scientists and practical business men whose own experience has caused them to overlook important avenues of improvement. The outsider — often with a crusading spirit and little else — is frequently the source of major technical advance. No government agency, no industry research laboratory, no planning can encourage such persons and companies, for the prospects appear as poor to the planners as they do to the industry. Only when such persons and

(Please turn to next page)

HOW HOMOFLEX HOSE
gives you "More Use per Dollar"

INSEPARABLE
TUBE-TO-COVER BOND

EASIEST HANDLING
HOSE MADE

This Rugged Hose Handles Like a Rope!

Strong enough to stand up under the toughest job conditions, Homoflex Hose is light in weight and as flexible as a rope. It's the easiest handling hose made for use with air, water, and other fluids and gases! The exclusive Homoflex construction increases hose life, too... assuring you "More Use per Dollar" for every length you buy.

Homoflex Hose has no pre-set twist. It is mandrel-made to coil and uncoil freely in any direction without kinking. This eliminates the strain that could otherwise lead to costly internal damage and hose rupture. An exclusive process creates a homogeneous, inseparable tube, strength member and

cover bond that combines maximum flexibility with rugged strength and durability. Homoflex Hose reduces hose costs because its easier handling features enable workers to get more work done... and because it lasts longer. Couplings are easier to fit, too, because Homoflex Hose maintains uniform inside diameters.

Ask your R/M representative about easy handling Homoflex Hose for your operations. He'll also tell you how other types of R/M Hose for general and special purposes do a better job, longer... give you "More Use per Dollar".

RM 847

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



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V-Belts



Conveyor Belt



Hose



Roll Covering



Tank Lining



Abrasive Wheel

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Clark

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- ★ EASY TO INSTALL
- ★ LOW MAINTENANCE
- ★ MINIMUM INVENTORY

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Patents

(Continued from preceding page)

companies can carry on with a prospect of a protected market and unusual profits, can they continue the efforts that so often lead to major technical breakthroughs.

Of course patent rights can be — and have been — used to violate the antitrust laws. As the Supreme Court said many years ago, a patent does not confer "a universal license against positive prohibitions." But the abuse of some patent rights does not warrant a generalization that the patent system is in conflict with the antitrust laws. Indeed, it is only when we give an arbitrary and narrow definition to competition — and exclude competition in research, product improvement, and the commercialization of new products — that the patent system comes into conflict with the antitrust laws.

Thinking about our patent system is in a high state of flux. Everyone concerned has a different slant on what should be changed, if anything. Perhaps, *you* have some definite feelings on the subject, along with some well-thought-out ideas. If so, we would like to hear from you. Write to:

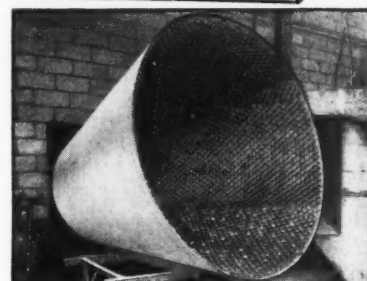
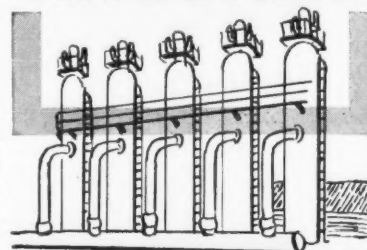
JOHN C. VAALER
Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Ill.

These considerations are too often overlooked. As a nation we have fallen into the habit of looking upon patents and competition as antagonistic. Too frequently patent victories are viewed as affronts to competition, or the enforcement of the antitrust laws is regarded as necessarily weakening the patent system. The fact is that we need both an effective and viable patent system and a vigorous policy of antitrust law enforcement — for only by so doing can we enjoy the benefits of competition extending over the full spectrum of business activity.

The Job Ahead

These considerations not only dictate a patent system, but they also demand a meaningful one. A ribboned certificate of invention will not do. Nor can these objectives be attained if a letters patent is little more than a ticket to go to court — or if the patentee is hemmed about by technical legal rules and procedures that drain all practical value from the grant.

FEWER "TURN-AROUNDS"



Shutdowns for repairs of fire clay linings in refractory units are expensive. The frequency and duration of these shutdowns can be greatly reduced by the use of a steel grating armor known as "Gridsteel", which holds the castable refractory linings in place longer and armors them against the bombardment of catalytic elements.

"Gridsteel" is available in a special loose clinch to conform easily to curved surfaces.

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When inquiring check 3771
opposite last page

CHEMICAL PROCESSING

The problem is largely administrative. The Patent Office is far behind and struggles with an unreasonable work load in relation to available personnel. The elusive "invention" test is a source of frequent controversy. Patent litigation and other proceedings are unduly complex, slow, and expensive. Many of these are problems calling for the combined efforts of the Congress, industry, and the bar for their resolution.

The problems, however, should not be permitted to detract from the underlying importance and vital necessity of the patent system as an institution. The significant fact is that the patent system stimulates competitive effort and is wholly consistent with the antitrust laws and a competitive economy. The real opportunity of the times is not one of resolving a "patent-antitrust" controversy. Rather it is to make the patent system do more effectively what it is already doing, to assure that patent issues are treated in their proper perspective, and to continue to enforce the antitrust laws — all to the end that the future will be one of continued technical progress within the framework of a competitive order. ■

Lithium Markets

(Continued from page 14)

Once the basic research was done, the principal petroleum companies, as well as independent grease manufacturers, began development work and eventually came up with improved greases. Industrial consumers (and even some service stations) became enthusiastic about these greases to the extent that today lithium greases represent a substantial portion of the total production of greases.

Organic chemical reactions

Research and development in the field of organic chemistry are now underway, and look very encouraging. In 1950, most of the work was in the "Ivory Tower" stage, and the problem was, first, to get basic information into the hands of those who could put the ideas to commercial use and, second, to get organolithium reactions into production.

We searched the literature and published a book which has proved very popular, "An Annotated Bibliography on Uses of Organolithium Compounds in Organic Synthesis." The original book has been kept up-to-date by four supplements. Its popularity is best indicated by telling you that up to 1956, over 2000 requests have been received from genuinely interested persons for copies of these bibliographies.

Much work is going on in the organolithium field. For example, we're finding improved methods of vitamin synthesis. Also, Firestone Tire & Rubber Company has produced a synthetic "natural" rubber using lithium dispersions, where lithium acts as an

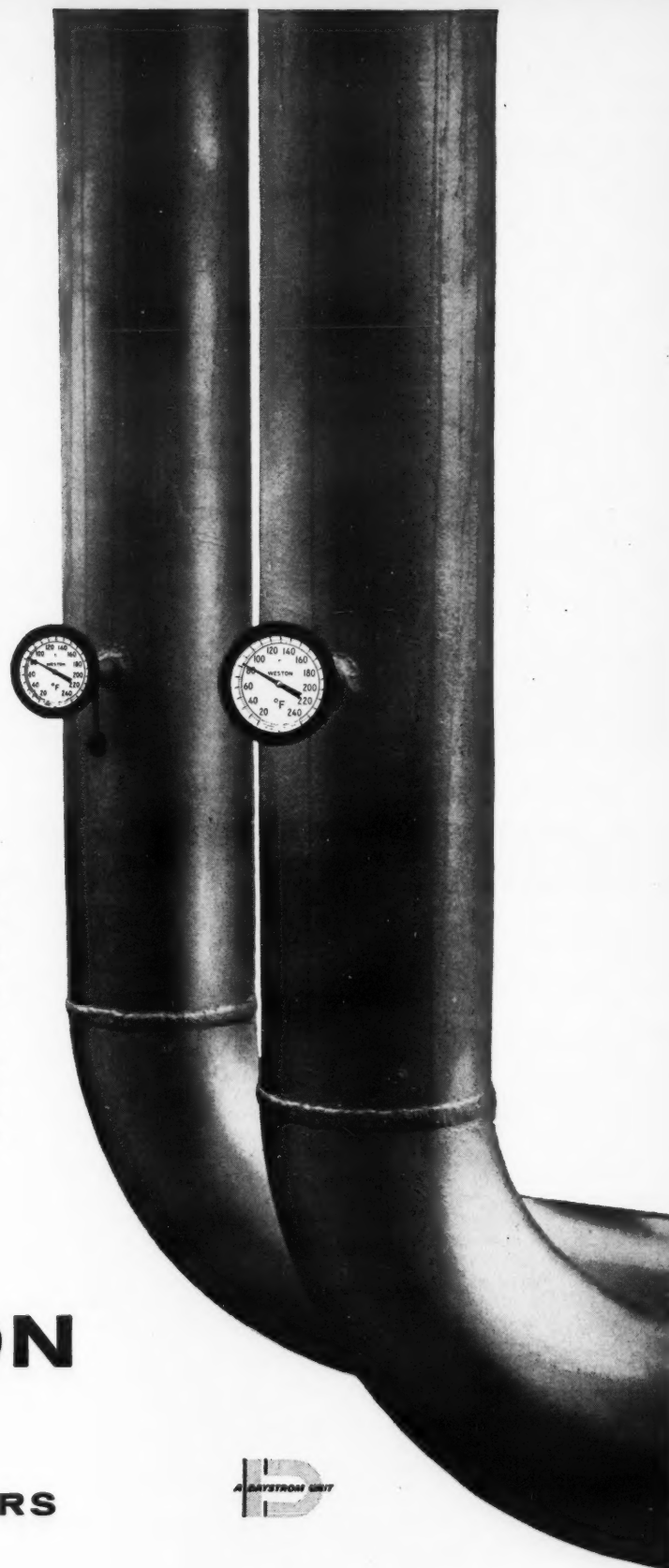
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- **and right for budget reasons**, because they give trouble-free service for years — bring thermometer costs 'way down

Weston bimetal thermometers are available in types, sizes and ranges for industrial as well as laboratory needs. Bulletin T13 gladly sent on request. Weston Electrical Instrument Corporation, Newark 5, New Jersey.

WESTON
Bimetal
THERMOMETERS



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Industry's blistering pace demands...

ALL-OUT BOILER PERFORMANCE LIKE LITHIUM CORP. IS GETTING

Lithium, the "Horatio Alger" metal, is making an impact on every segment of industry... and Lithium Corp. of America's plant at Bessemer City, N.C. is meeting the mushrooming demand by peak load refining. This processing requires high pressure steam for vacuum jet equipment, a load of 60,000 lbs. per hr. at 140 psi. on the two Bros Packaged Boilers.

This peak load boiler performance is important, of course. Another big point in the Lithium plant boiler room is nominal maintenance; water tube inspection of these Bros boilers after 15 months of near-capacity operation showed no scale formation.

That's the kind of performance that makes a real hit with boiler engineers; yet Bros-engineered flexibility and

economy pay off in the front office, too. Here's why:

Complete factory-assembled units. Bros Packaged Boilers are self-contained units, easy to transport and easily installed at low cost. They go on-the-line with simple service connections... no time or money wasted on slow, costly erections at the plant. These boilers quickly respond to varying loads; they supply steam requirements often expected only of larger, more expensive boiler equipment.

Capacities range from 4,000 lbs. steam per hour and up. Whatever your steam needs, Bros has the precise Packaged Boiler for the job. These units burn oil, gas, or both. Equipped with fully automatic, semi-automatic or manual controls.



POWER DIVISION

BROS Incorporated

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When inquiring check 3773 opposite last page

Lithium Markets

(Continued from preceding page)



Pelletizing equipment for lithium salts

ionic catalyst. Perhaps others may follow. Lithium in this form offers increased yields and reduced reaction times. We see a bright future in store for dispersions of lithium metal.

This brings us to another phase of market development. It used to be that lithium was available in only one form: cumbersome one-pound ingots. Now, besides dispersions, the metal is available as shot, wire, ribbon, rod, and cups. Thus, the work of the research chemist is made easier.

Lithium hydride

Biggest possibility here is in propellants. I'm sorry, but one can only refer to published unclassified literature at this time. I can say, however, that lithium has a heat of combustion of 18,000 Btu per pound, and is one of the three important elements in this class. (The others are hydrogen and boron, which have 52,000 and 25,000 Btu/lb respectively.) Lithium hydride is used in the making of complex boranes, possibly the propellants of the future.

We're experimenting with dispersions of lithium hydride, and have made such dispersions as high as 35% (by wt) in certain hydrocarbons. The field is wide open with more to come.

Heat-transfer medium

Of all the common heat-transfer media, lithium has one of the longest working ranges between melting and boiling point: from 180° to 1317°C.

(NaK has a range from -11 to 784°, Pb from 327 to 1737°, and PbBi from 125 to 1670°C, but all three are much denser and have lower heat capacities and latent heats of vaporization.)

V-BELTING BY THE MILE! Fasteners by ALLIGATOR

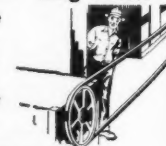


✓ Open-End V-Belting (in rolls) is now supplied by all major V-Belt manufacturers.

✓ Improved **ALLIGATOR V-BELT FASTENERS** are recommended by all manufacturers of Open-End V-Belting (in rolls).

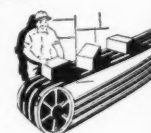
Need a 23'-3½" Long V-Belt?

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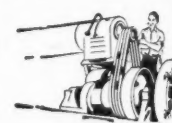
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Got a shaft you want to go around?

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Ask for Bulletin V-219

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ALLIGATOR V-BELT FASTENERS

When inquiring check 3774
opposite last page

CHEMICAL PROCESSING

Corrosioneering News

Quick facts about the services and equipment available to help you reduce corrosion and processing costs.



Published by The Pfaudler Co., Rochester, N.Y., U.S.A.

The only big problem with molten lithium is its extreme corrosiveness. Studies are going on to determine whether this corrosion is due to the metal itself or to the impurities commonly found in the commercial grade of lithium metal. Undoubtedly the problem will be solved before too long.

In addition to the attention given to molten lithium metal as a heat transfer medium, certain salts of lithium are being investigated as components of molten salt heat transfer systems. Compositions containing lithium halides and other alkali metal halides appear to be particularly interesting because of their low density in some new unique types of heat exchangers.

Our company subsidizes much research in colleges and research institutes. Armour Research Foundation, University of Pittsburgh, Pennsylvania State University, Tufts College, and Purdue University are included among those in our grants. We firmly believe in the future of lithium and are currently — through many research projects — investigating self-fluxing brazing alloys, porcelain enamels for aluminum, lithium as a direct reducing agent, applications of organolithium compounds and dispersions, and various research projects on lithium and lithium compounds.

We are also setting up a technical information center so we'll have at our fingertips all known information about lithium and its compounds. We plan eventually to put the facilities of this center at the disposal of all investigators.

As far as sales go, we netted over \$12 million in sales last year, and prospects for 1957 indicate that we'll exceed this figure by a considerable margin. Despite the many "blind alleys" we have poured research development and sales effort into, this growth is quite a jump from our very humble beginnings back in 1943.

This is not entirely a "success story". On the contrary, it contains about the same proportion of "wrong turns", bad guesses, and frustrated hopes that have made up the story of many a struggling chemical company over the past five decades. And so it may continue to be.

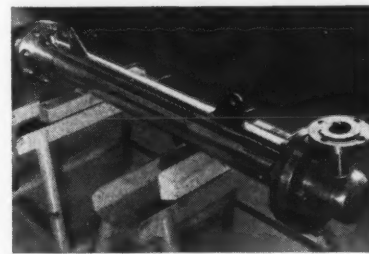
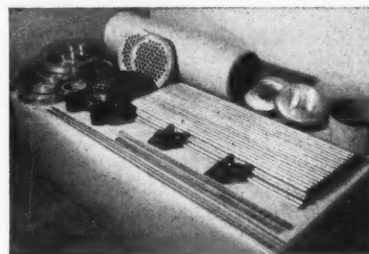
Probability Budget

(Continued from page 17)

represent how much more profits would have been made if a different course of action had been taken. In this particular instance, on a unit basis, let us assume the company will lose the difference between the sales price of the product and its variable costs.

For this example assume that the cost of carrying unsold inventories will be two cents per unit, and the opportunity cost of not making a sale will be eight cents per unit (chart E). The question raised now

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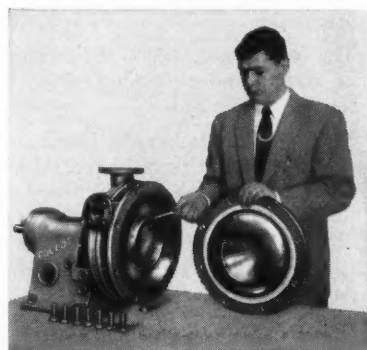


From stock parts... to finished heat exchanger... to you without the time consuming delay of "custom design."

Pfaudler stockpiles a complete line of flexible-standard components which can be assembled to fill your needs in *two to six weeks*.

Two-week delivery possible

If your process requirements can be met by either a single- or double-pass carbon shell heat exchanger in the capacity range between 56 to 316 sq. ft., you can get "off-the-shelf" delivery in *just two weeks*. Other standard sizes up to 20" shell diameter are quickly assembled to your specifications in *just four to six weeks*.



New glassed pump fights off corrosion for years. A new Goulds' centrifugal pump with Pfaudler glassed interior surfaces assures years of corrosion-free operation at low cost.

Resists all common acids except hydrofluoric to at least 212°F. and alkaline solutions up to pH 12 at 212°F.

Write to Goulds Pumps Inc., Seneca Falls, N. Y. for descriptive bulletin.

Tally these added advantages to your profit when you order Pfaudler heat exchangers:

They're versatile. Use them as heaters, condensers, or coolers. These units are designed to ASME and TEMA codes for 75 psi tube pressure and 150 psi shell side pressure up to 350° F. Only slight modifications are required for higher pressures and an expansion diaphragm can be added to meet higher temperature gradients.

They're economical. Due to standardization of design and the pre-stocking of components, they cost much less than custom built units.

They're leakproof. No internal gasket. No possible intermixing of the hot and cold fluids because of gasket failure.

The flexible standard components, are all made of stainless steel. However, when your requirements call for them, these parts can be made of Nickel, Inconel, Monel, Hastelloy, Zirconium, Titanium, and combination glassed steel with Karbate or alloys.

Pfaudler engineers are always ready to help you with your heat exchanger problems.

You'll also find a copy of Manual 837, "Pfaudler Heat Exchangers and Condenser," helpful. Along with complete descriptions of Pfaudler heat exchangers and condensers, it contains useful performance and thermal design data. Write for a copy today.

How to take the guesswork out of buying columns

It's no easy matter to select the proper columns for a given operation.

You have to balance such diverse factors as cost, corrosion resistance, handling and cleaning, vapor and liquid capacity, pressure drop, load efficiency, etc., etc., etc.

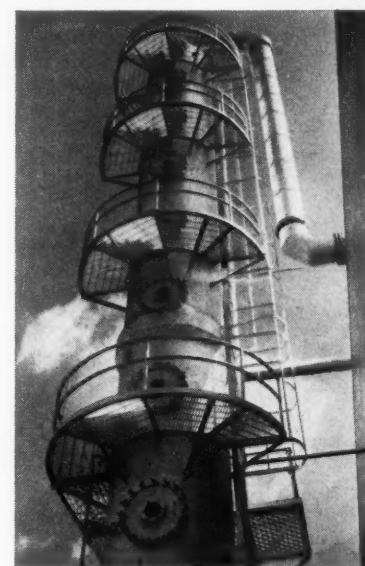
Pfaudler has had long years of experience designing and fabricating columns for fractionating, stripping, absorption, extraction, and numerous other chemical reactions.

You can make good use of our experience in fabricating with glassed steel, as well as a great many alloys, and from our design experience with bubble caps and perforated or sieve tray columns, Turbogrid tray column, as well as packed and spray type columns.

To begin with you can find the answers to many basic questions in our Bulletin No. 940. Write for a copy.

Then you can check with Pfaudler for detailed answers to your specific problems.

Result? Simply the right column for your process.



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CORROSION RESISTANT METAL INSTRUMENT LINE HARNESS

DEKORON Metl-Cor®, tried and proven in years of service in literally thousands of installations, is impervious to attack from even the most corrosive industrial atmospheres and weather conditions.

Dekoron Metl-Cor is a multiple tube bundle of copper or aluminum tubes over which is extruded a thick sheath of corrosion-proof plastic. This harnessed construction means that it costs much less to install than ordinary metal tubing because many tubes are installed at one handling. Metl-Cor instrument line harness is available with from 2 to 19 (7 illustrated) tubes per bundle, up to 1000 ft. in length.

Corrosion resistance . . . elimination of tubing replacements . . . ease and speed of installation—no other metal instrument tubing can compare with patented Dekoron Metl-Cor. Request Bulletin 456 for additional information.

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Probability Budget

(Continued from preceding page)

is where should the decision line be placed in order to maximize expected profit.

The answer is simple, and its correctness can be appreciated intuitively. The total of both costs is ten. Unit costs on the left (as on chart F) represent 20 percent of total while costs on the right represent 80 percent. The higher a particular cost is in relation to total unit cost, the lower its probability should be and vice versa. The total expected profits are maximized, or the total expected loss is minimized when the probability of the eight cent unit cost is 20 percent and the probability of the two cent unit costs is 80 percent. From this analysis it will be seen that the vertical decision line will be placed to the right of the probable on the probability distribution of expected sales. *Cost is minimized when the probability of each cost is inversely proportional to its percent of total cost.*

Any point other than the vertical decision line will give expected costs at a level higher than the expected costs at the vertical decision line.

Regarding the costs which apply to this approach, the first job is to segregate those which are incremental to the decision compared with those which are constant. Only costs which are incremental to the decision will be considered. In the specific example, let us consider the costs which are incremental to the decision concerning inventory. Assumptions must be made on how inventories in excess of demand will be handled. Will they be stored for long periods of time or will they be stored only short periods of time and the excess inventories absorbed by the significant lowering of the production level? Once these assumptions have been made, it is necessary to include the cost of changing production and production levels as well as the cost of carrying inventories.

The cost of lost sales is the incremental profits lost on each pound of product which can be sold, but cannot be supplied.

This approach makes the barest indentation into a very large field. It can be applied to a large number of operating decisions which are to be made. Actually, because real events in the future are frequency distributions of expectations rather than certainties, it can almost be applied to any decisions which we have to make.

It is most valuable as compared with the conventional approach where forecasting variability is very high, and where the costs of exceeding or falling short of the decision are of greatly different magnitudes. The approach has any number of ramifications. It can be applied to decisions taken in sequence. It can be set up so that two or more decisions are made on one probability distribution of expected sales. It can lead to developing new methods and new approaches for costs in areas not costed before. ■

measuring
gas or liquid
flow?



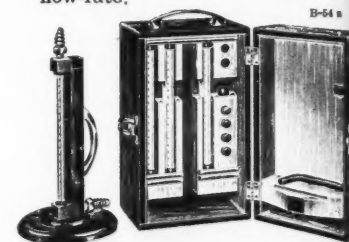
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FLOW-METER KIT

does it quickly,
efficiently!



Here is an easy-to-operate, portable kit which measures liquid flow-rates in the range from 0.025 cc to 2100 cc per minute and gases from 2 cc to 38,000 cc per minute. These wide ranges are handled by four interchangeable glass flow-tubes, with two calibrated glass and four calibrated steel ball floats. In operation, the flowing gas or liquid lifts the calibrated ball. The scale is read at the point of balance, and a graph supplied shows the corresponding flow-rate.



Complete Kit \$124 Including Case

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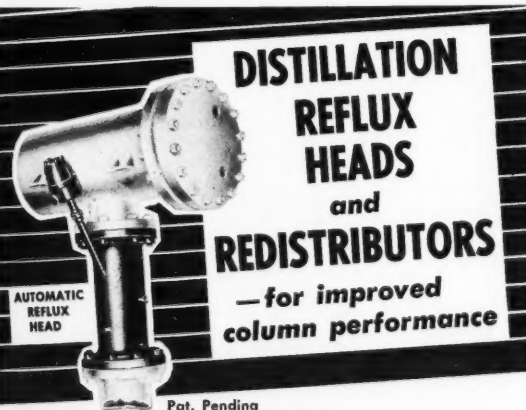
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PAT. PENDING

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Explosion-proof, electrically-operated for high vacuum, pressure and temperature, and for corrosive and hazardous service. Eliminate reflux control problems with its simple, accurate and dependable operation.

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Distributes liquid evenly over the packing and minimizes channeling. Improvements to 100% in plate efficiency are usually possible. Especially suitable for vacuum distillation. Readily installed in existing installations.

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Discussed in This Issue - - -

PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

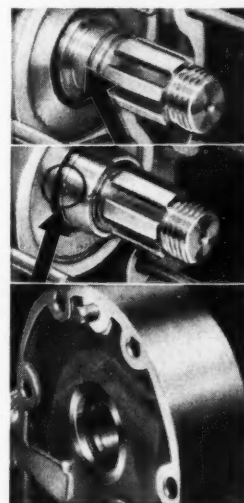
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New Waukesha Sanitary Pump with Vented Cover.

No product leakage . . . no intake of air with the new Twin O-Rings in WAUKESHA PUMPS. Sealing is engineered to handle vacuums up to 27 inches of mercury; pressures up to 150 PSI.



Here's How The O-Twins Work

Picture at left shows one O-Ring fitted to the shaft. Known as the shaft sleeve seal rubber, it not only seals but provides exact positioning of the impellers. Next picture shows the stainless steel sleeve which fits on shaft over the O-Ring. Arrow points to pin which fits a slot in the sleeve so that sleeve and shaft must rotate together. No galling, no siezing, no misalignment, no shaft wear! And no leakage!

Where's the Other Twin?

It's located in the pump body as the 3rd picture shows. When cover and pump body are together, the stainless steel sleeve rotates inside this ring. Again, no shaft wear at this point. The sleeve is reversible—doubles its life.

But these are only three of the features in the NEW WAUKESHA PUMP—there are 18 in all—to make your choice of WAUKESHA more profitable with far less maintenance and far longer service-life, get in touch with your WAUKESHA distributor.



Here's WAUKESHA'S 1957 Catalog to tell you the whole story of WAUKESHA Pumps. Tell us what product you handle. Send a postcard today.

*Positive Displacement

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Dept. P-5, Waukesha, Wisconsin

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THE ANSWER TO YOUR WATER PROBLEM



BEACH-RUSS Vapor Purge Pumps

Stop Internal Vapor Condensation

... Improve Efficiency on Moist Circuits

Beach-Russ "Vapor Purge" pumps are designed to give highest efficiencies on moist circuits. Condensate gases are controlled so that it is impossible for the vapors to condense in the pump itself and impair its efficiency. These new "Vapor Purge" pumps, based on the well-known design of Beach-Russ Rotary Vacuum Pumps, can be used without the purging feature, if desired.

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Write for "Vapor Purge" Pump Literature.

BEACH-RUSS COMPANY

50 Church Street • New York 7, N. Y.

Address Department 46

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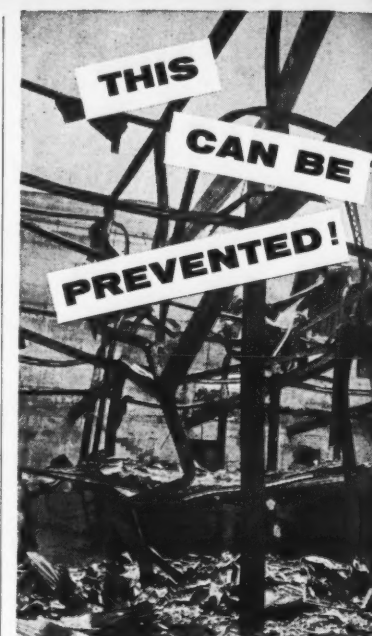
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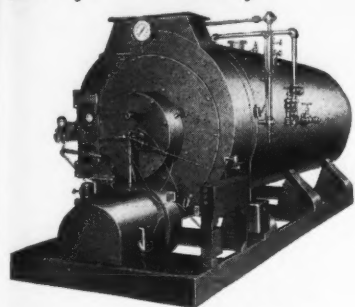
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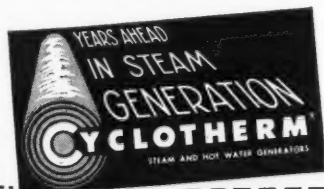
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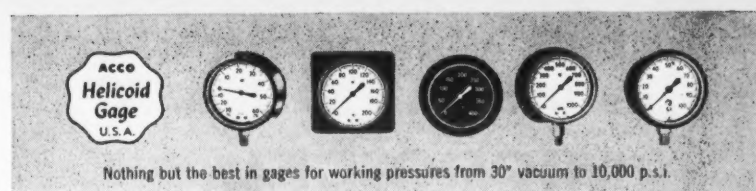
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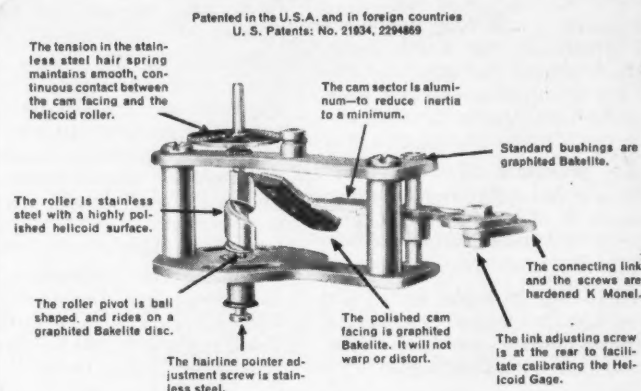
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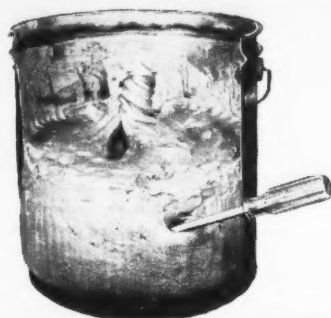
Johns-Manville MICRO-CEL

A product of the Celite Division

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* Unretouched photo shows five gallon pail of heavy, nearly solid sealing material. A Graco Powerflo Pump successfully pumped it out of original pail. WRITE FOR DETAILS on Graco Lab test to check pumpability of your materials. Graco lab report furnished without obligation.

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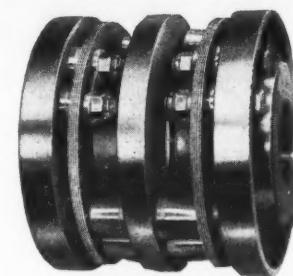
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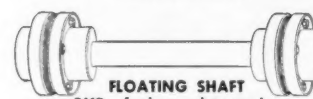
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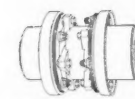
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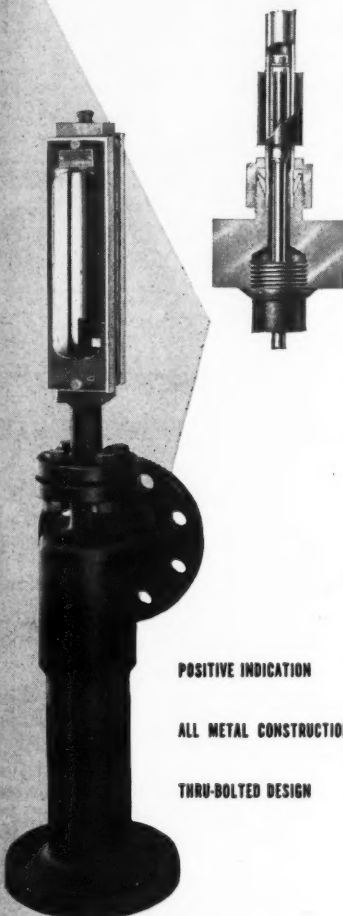
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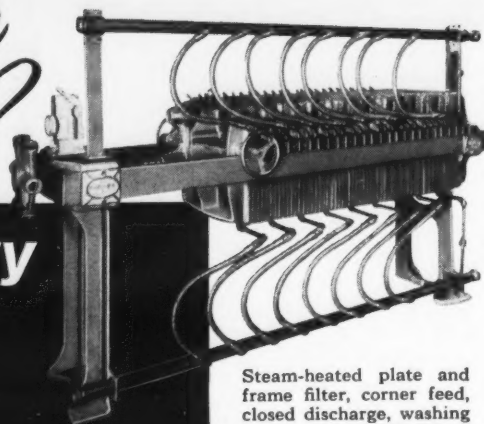
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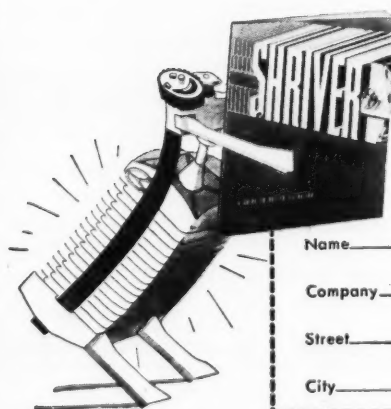
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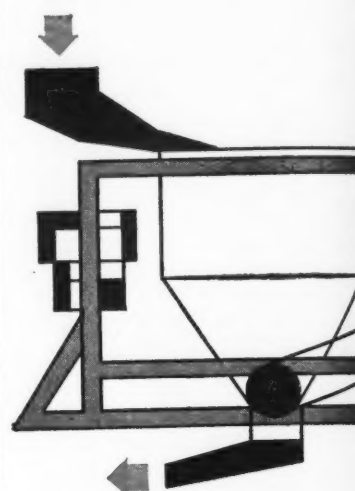
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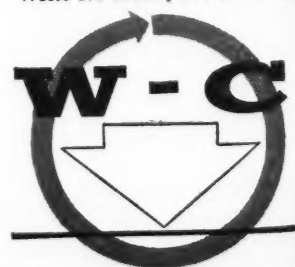


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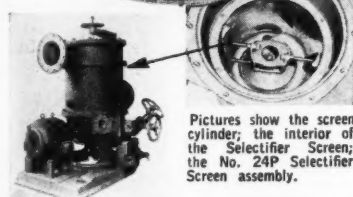
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Flexrock Teflon* Packing no. 405

Constructed of fine Teflon fibers tightly braided over a resilient core of glass fiber and impregnated with Teflon. Flexrock 405 is an excellent chemical packing. It is especially recommended for use against concentrated acids such as sulphuric, nitric, sodium hydroxide; alkalis, etc. Flexrock 405 Teflon Packing has a maximum temperature range of 500°F., and comes in sizes of $\frac{3}{16}$ " to 1". Smaller sizes available with solid core.

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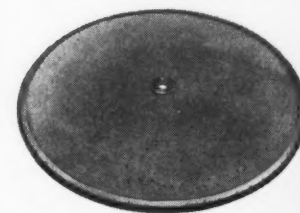
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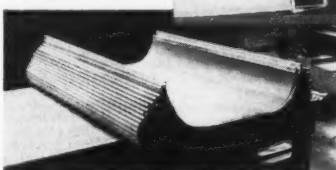
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Cloth woven as fine
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stainless steel,
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Circular vibrating screen with
fully tensioned cloth.

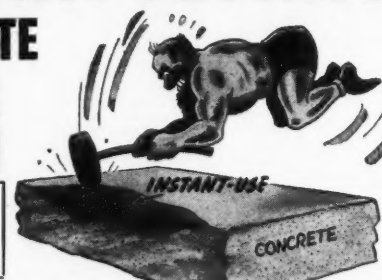
Vibrating screen
panel with cen-
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strip. Close-up
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binding on
standard panel.



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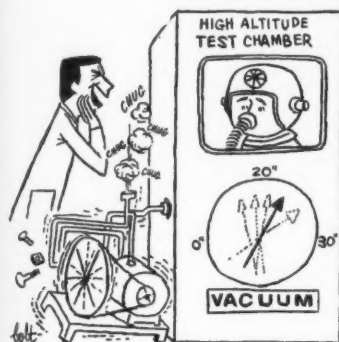
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CHEMICAL PROCESSING

**THAT'S
INTERESTING**

(Continued from page 2)



"Stop sweating, Joe, or we'll never make 200,000 feet!"

Perspiration limits high-altitude tests

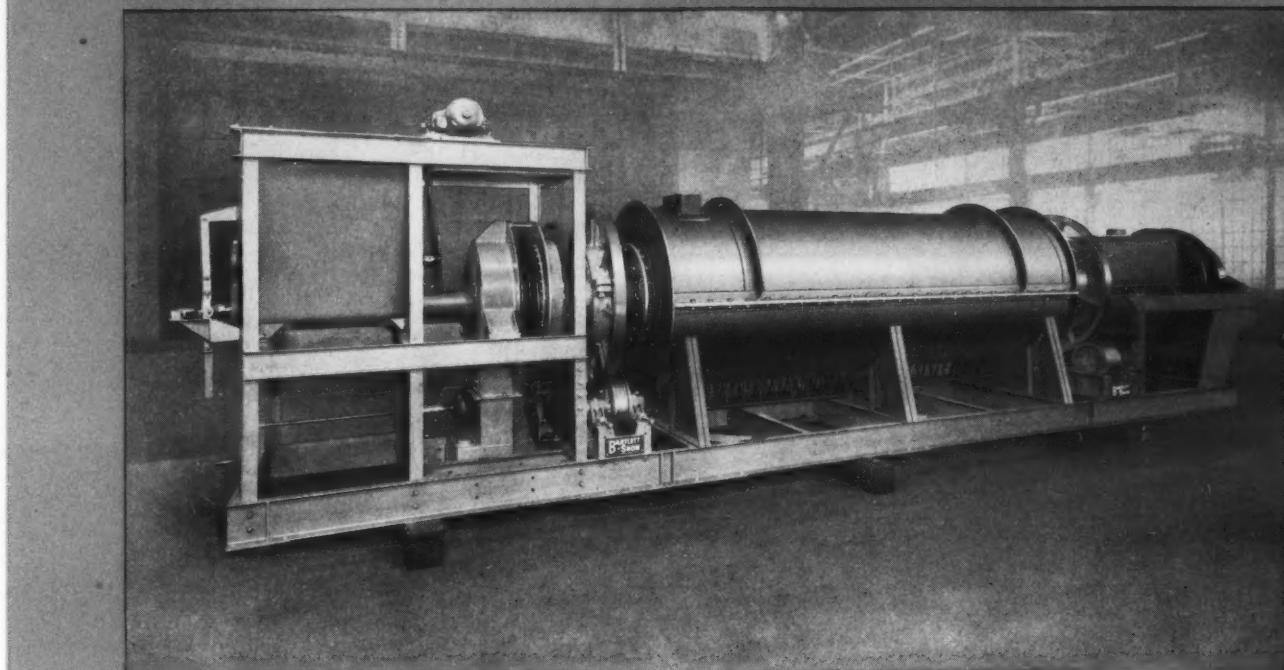
Highest simulated altitude ever reached by man — 198,770 ft — fell short of the 200,000-ft goal because a man perspires. Vacuum equipment, which could simulate an altitude of 260,000 ft on the 50-cu-ft empty test chamber, was halted at a lower level by evaporation of perspiration when chamber was occupied.

How much does heat weigh?

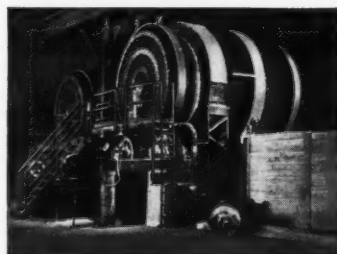
By "weighing heat", Aro Equipment Co. of Bryan, Ohio is able to determine efficiency of "bottles" used to store liquid oxygen in military aircraft. Bottles are weighed immediately after filling, and again after a given period of time. Latent heat of vaporization for oxygen is then used to determine heat gain from weight loss, and efficiency calculated.

Scales that provide sensitivity and visual indication needed to meet critical tolerances were supplied by Deteco Scales Inc., Dept. CP, 540 Park Ave., Brooklyn 5, N.Y. . . . or for more information reader may simply check 3799 on the convenient Reader Service slip located on form opposite last page.

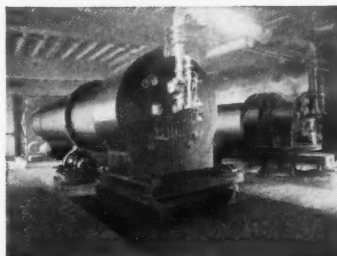
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continuous *Calciner and Cooler*



Two Bartlett-Snow Rotary Oil-Fired Batch Kilns Pre-heating Charges for Electric Furnaces.



Two Oil-Fired Continuous Kilns Working Temperature 2300° F.

... permits materials to be processed continuously at temperatures from 900° F to 2100° F in a reducing, oxidizing or neutral atmosphere, cooled, and discharged at 200° F or lower.

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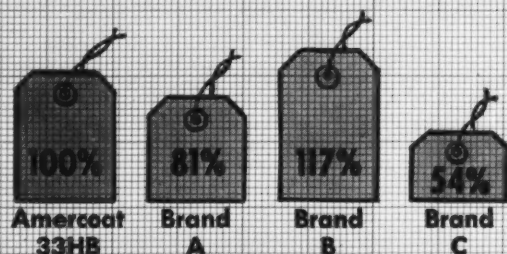
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How price
per gallon
compares
on leading
vinyls



UNLESS YOU

compare mil sq. ft. per gallon and...

Sq. ft. coverage per gallon, 1 mil thick

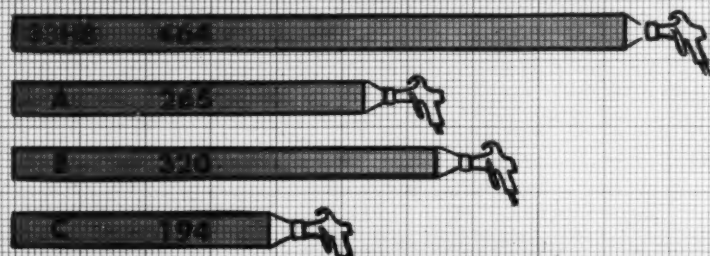


FIGURE THE

material cost of each coating, then get the...

			GALS.	COST
Needed to coat 250 sq. ft. 5 mils thick	33HB		2.68	\$17.37
	A		4.72	24.78
	B		3.91	29.72
	C		6.44	22.54

REAL COST

by adding labor for the number of coats needed.

Labor & material cost, 250 sq. ft. x 5 mils thick

33HB		\$37.47
A		60.18
B		59.05
C		70.84

Announcing... A True High Build Vinyl Coating

Amercoat 33HB now gives you
even more "mils per gallon"
—and at the lowest cost of
any leading vinyl!

At last, the two major limitations of vinyl protective coatings—critical adhesion and low film thickness—have been largely overcome. Amercoat 86 Primer stopped adhesion troubles, eliminated underfilm corrosion and undercutting, and simplified surface preparation. Now Amercoat 33HB Topcoat builds thick films in fewer coats at surprising savings.

Amercoat 33HB is a "high-build" version of Amercoat 33, the standard of the protective coatings industry for over ten years. 33HB gives you the same high resistance to corrosive chemicals, severe weathering and abrasion, plus 33% greater thickness per coat! The solids content of 33HB tops all other non-mastic vinyl coatings, yet workable viscosity is retained. It applies smoothly and easily by hot or cold spray. No need to stock two types of materials.

New Lower Cost

In evaluating any coating, always look at the cost per square foot, and the number of coats required to build proper film thickness. 33HB is nearly 24% cheaper per mil square foot than traditionally low cost 33... and compared to other leading vinyls, (see chart) savings are even greater. For example, although the gallon price of Coating "C" is 46% lower than 33HB, because of its low solids content the actual material cost for 5 mils thickness is almost 30% higher than 33HB, and the applied cost, (labor and material) is almost 90% higher.

For the full story, send coupon for data on 33HB and detailed cost comparison of the four coatings on the chart.

Amercoat CORPORATION
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